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An Administrative Microcomputer Literacy Training Model for Elementary School Administrators of Virginia Beach, Virginia

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AN ADMINISTRATIVE MICROCOMPUTER LITERACY TRAINING MODEL FOR ELEMENTARY SCHOOL ADMINISTRATORS OF VIRGINIA BEACH, VIRGINIA

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ABSTRACT

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Old Dominion University, 1986
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The purpose of this study is to design a process product administrative microcomputer literacy training model for 43 principals and 44 assistant principals in the Virginia Beach elementary schools. In order to accomplish this purpose, a systematic process for assessing administrative microcomputer literacy training was developed. The training assessment process included the identification of the following: (1) administrative microcomputer literacy training needs, (2) school administrators' attitudes toward microcomputer use, (3) barriers and facilitators influencing administrative use of microcomputers, (4) organizational factors needed to facilitate and support administrative use of microcomputers in schools, and (5) school administrators' training preferences and learning styles.

Based on this administrative microcomputer literacy training needs assessment process, an administrative

microcomputer literacy training paradigm was designed. Specific tasks of this training paradigm are as follows: (1) to establish cognitive, proficiency, intrinsic, and extrinsic goals; (2) to devise a training format; and (3) to develop change strategies that would facilitate and support the use of microcomputers in schools.

An adaptation of the Zemke Needs Assessment for Computer Literacy Training model and the Roberts Local Process of Change model serve as the basis for the development of this study's training model and training needs assessment process. The following three separate survey instruments were designed for data collection: open-ended interview questionnaire, semi-structured pilot instrument, and structured survey instrument. The open-ended interview questionnaire and the semi-structured pilot instrument were exploratory and used to refine the structured survey instrument. The structured survey instrument was designed by utilizing the responses from interviews and from the pilot population and administered to the study population.

The findings of this study indicate that microcomputer literacy training must respond to the specific training needs of specific school personnel in specific positions. It must also provide change strategies that can facilitate and support the use of microcomputers in schools. Examples of change strategies are providing access to microcomputers in school offices and on school

administrators' desks, as well as making the microcomputer available to take home, and incentives for microcomputer use in schools through recognition possibilities, release time, promotion opportunities, and financial rewards.

For urban school officials, this study provides (1) an administrative microcomputer literacy training paradigm that is designed to increase knowledge and skills in microcomputer use and to effect and sustain the change to microcomputer use in schools, (2) a training format that is structured to meet the identified microcomputer literacy training needs and preferences of school administrators, and (3) a process product training model that can enable school systems to design their microcomputer literacy training efforts and to plan for training implementation and outcomes.

DEDICATION

To my husband, Gordon Jon, my son, Ryan Gordon,
and my daughter, Morghan Elizabeth.

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CHAPTER I

INTRODUCTION

At the present time, approximately four million computers are found in homes, and experts predict that by 1990 this figure may well reach over 20 million. The National Center for Educational Statistics estimates that the number of microcomputers in schools tripled between 1980 and 1982.[1] Neill reports that the large-scale movement of hardware into school systems started in 1982-83. By 1983, public schools had an estimated 200,000 microcomputers and by mid-1984, the number reached 350,000.[2]

Market Data Retrieval Research Company projects that the market for school computers may grow well over $145 million in 1985.[3] The U.S. Department of Labor predicted that in 1985, 80 percent of all jobs would require the knowledge of how to use computers.[4] The educational implications of these statistics are that public education must not only prepare students for computer use but school teachers and administrators also need to learn how to use microcomputers.

In the late 1970s, numerous predictions were made concerning the microcomputer and its role in education. In

the years since, this new technology has been viewed as one way to improve educational programs, administrative management, and educational services of schools. The increased number of microcomputers in our schools today is evidence that this new technology plays a major role in education. No matter how large schools are and whether they are located in small towns or major urban areas, school systems are asked "to serve the post industrial era" that requires the storing and transmission of enormous amounts of information--more than at any previous time.[5]

School administrators are increasingly required to make effective management decisions, to systematically monitor students' progress or lack of it, and to exert strong administrative leadership. As school administrators feel the increasing pressure to gather, store, and retrieve information, it is not surprising that school districts are looking to microcomputers as possible aids for improving school management.

However, Podemski offers a caveat to the future of the microcomputer innovation in schools by stating that "Technology can have a productive impact upon education, but it must be put into use before the impact can be realized."[6] Christopher Evans in The Micro Millenium, writes, "One of the biggest untapped markets in the world is the application of computers to education."[7] He predicts that people will soon be turning to the computer

for assistance when they realize their future in a world overloaded with information.

Arthur Melmed, of the National Institute of Education (NIE), affirms the need for research in the area of technology and educational administration by suggesting that the combination of new knowledge and new low-cost information technology could improve the quality of education, increase human capital, and improve productivity.[8] Dustin Heuston, presenter at the Joint Hearings, House of Representatives, Ninety-sixth Congress, advanced the notion that

> The task in the decade ahead will be to harness the exponentially greater amount of work that the computer can generate for the educational delivery system in a useful way that will help children and faculty members complete their educational tasks successfully and in an atmosphere that is pleasant.[9]

Both Melmed and Heuston underline the need to investigate the combination of new knowledge and technology as a possible way to better manage our schools and to raise the productivity of school administrators.

John Naisbitt writes in Megatrends that to restructure American society to an economy based on the creation and distribution of information requires matching the new technology with a compensatory human response. He reports that to his knowledge, no one has connected human potential to technological change. Now, at the dawn of the twenty-first century, Naisbitt asserts, "Technology and our human potential are the two great challenges and

adventures facing mankind today."[10] Cutts et al. summarize the machine and man phenomena: "Computers are fast, accurate, and stupid. In comparison people are slow, inaccurate, and brilliant. A marriage of the two yields staggering potential."[11]

In this era of fiscal restraint, the public's demand for accountability, and government's demand for documentation, the need for training school administrators in using the microcomputer at a reasonable level of proficiency is inescapable. Administrative microcomputer literacy training must precede the effective use of these machines as an administrative tool. Schools must provide administrative and instructional computer literacy training if, as Andrew Molnar, program director of the National Science Foundation, implies, schools are to stay in business. He is convinced that this training will become as important as reading literacy within the next two decades.[12]

Problem Statement

Technological advancement, economy, utility, and increased availability of microcomputers coupled with forces external to the schools will precipitate technological change and continued microcomputer growth. School administrators must be prepared to use the new technology and act as leaders in the utilization of microcomputers in their schools. One of the major

questions or dilemmas facing school officials appears to be exactly how to approach school administrators' computer literacy needs.

Daniel Brown, in his recent study on administrative computing in schools, indicates that "Computers are novel in education and though many popular articles are being written on the challenges they present to educators, little is known about how school personnel receive them, particularly for use in administration." Further, there is growing concern about school administrators' preparedness for the microcomputer innovation in schools.

Most school administrators lack the background and training in the computer field. This lack of background and training, according to Telem, might deter the effective use of the computer as a support tool for administration and instruction and even cause the failure of the computerization process in the schools. He also suggests that in order to overcome this situation effectively and rapidly, the establishment of a comprehensive training program for school personnel for the introduction and implementation of this new technology is necessary.[14]

With the arrival of microcomputers in the Virginia Beach elementary schools, it appears that a lack of administrative computer literacy training exists to prepare the elementary school administrators to use the micro-computer. The problem of "lack of training" is further compounded by a dearth of information on administrative

microcomputer training needs. To that end, this study provides the necessary data and information on training needs and subsequent training design that would increase school administrators' knowledge and skills in computer use and would effect and sustain the change to microcomputer use in schools. Ultimately, it is the intent of this researcher to provide a training model that would enable not only Virginia Beach schools but also school systems across the country to move closer to realizing the microcomputer potential for improving educational programs, administrative management, and educational services of schools.

Purpose

The purpose of this study is to design a process product administrative microcomputer literacy training model for 43 principals and 44 assistant principals in the Virginia Beach elementary schools. In order to accomplish this purpose, a systematic process for assessing administrative microcomputer literacy training needs will be developed. The training needs assessment process includes the identification of the following: (1) administrative microcomputer literacy training needs, (2) school administrators' attitudes toward microcomputer use, (3) barriers and facilitators influencing administrative use of microcomputers, (4) organizational factors needed to facilitate and support administrative use of

microcomputers in schools, and (5) school administrators' training preferences and learning styles.

Based on this administrative microcomputer literacy training needs assessment process, an administrative microcomputer literacy training paradigm will be designed. Specific tasks of this training paradigm are as follows: (1) to establish cognitive, proficiency, intrinsic, and extrinsic goals; (2) to devise a training format; and (3) to develop change strategies that would facilitate and support the use of microcomputers in schools.

The specific research questions addressed in this study are as follows:

1. What are the administrative microcomputer literacy training needs of Virginia Beach elementary school administrators?

2. What is the prevailing attitude toward administrative use of microcomputers among Virginia Beach school administrators?

3. What are the barriers that influence administrative use of microcomputers?

4. What are the current and desired facilitators that would support administrative use of microcomputers in schools?

5. What are the district-level organizational factors that would facilitate and support the use of microcomputers in schools?

6. What are the school-level organizational factors that would facilitate and support the use of microcomputers in schools?

7. What are the training preferences of Virginia Beach elementary school administrators?

8. What is the preferred learning style of Virginia Beach elementary school administrators?

Rationale

The growing popularity of microcomputers in schools is in sharp contrast to the limited knowledge available concerning the administrative use of microcomputers in the educational environment. The emphasis has been placed on developing the technology itself and less time on the effect of this new technology on work tasks, responsibilities, and practices of the user. Accompanying this situation is the lack of computer literacy training for school administrators.

To make the transition to an information age, school administrators need to become microcomputer literate. March reports that from many studies of the characteristics of American public school administrators and their career patterns, it becomes apparent that they desperately need training in computer technology and usage.[15] School administrators are essentially educators. They majored in education in an institution of higher learning which resulted in a teaching certificate.

As teachers, they continued their education part-time, becoming certified in educational administration, and move into the assistant principal and principal roles in schools. As principals, many continued their education to aspire to administrative positions within the school district offices. Few if any computer training courses were included. Subsequently, school administrators that are currently managing and leading our schools today lack the background and training in computer technology.

Formal training and retraining for computer literacy is exceedingly limited for school staff members. Informal programs are developing in response to this vacuum; but the content, depth, and quality vary. For example, the Tandy Company announced that it would provide teachers and administrators with up to 24 hours of free training at any of its Radio Shack centers. Retail computer stores may offer minimal training to customers when a computer is purchased. Universities are attempting to overcome the lack of computer literacy training by providing general introductory, programming, and some advanced courses in computer education.

Grossnickle and Laird indicate that strategies using outside consultants, packaged training programs, and one-shot, pre-implementation computer training are often ineffective. Lack of agreement on the direction and interest of such training is frequently due to "quick fix"

approaches based on limited data on training needs. The underlying factors may be that the faculty and staff acceptance of ideas and changes is dependent upon whether there is a relevance to their specific needs, tasks, and situation.[16]

Telem advocates that training become incorporated into the educational system and answer the specific needs of the school.[17] McMeen stresses that "local identity" needs to be preserved in training opportunities.[18] The pressing concern now becomes how to identify the specific training needs of school administrators and tailor the training to meet these needs. Various assessment procedures should be a vital part of training programs. Splittgerber and Stirzaker advocate that superintendents and staff begin immediately conducting an in-depth needs assessment of their school district.[19]

Cutts et al. report that "for a significant change like the introduction of microcomputers into schools, educational administrators are the key, since they can be leaders or barriers."[20] School district officials need to be at the forefront in designing appropriate administrative computer literacy training in order for the microcomputer innovation to influence education in ways that other technologies have not. The integration of computers into and across the educational spectrum is an issue of the highest importance in education today.[21]

The computer literacy movement in education has its roots in elementary education. Microcomputers have entered the elementary schools and classrooms through parents who are urging computer use and through the new computer language, Logo, which promises to give all children the key to unlock their learning potential. Elementary school administrators need to respond to this new technology for education by making decisions and recommendations regarding curricular changes, hardware and software acquisitions, and microcomputer training opportunities for elementary school staffs. Obviously, elementary school principals need administrative microcomputer literacy training to function as leaders in these areas as well.

Methodology

The Virginia Beach school officials have given their support to this researcher to conduct a microcomputer training needs assessment and to design an administrative microcomputer literacy training paradigm for their elementary school administrators. Subsequently, the research population of 43 principals and 44 assistant principals in the 43 Virginia Beach elementary schools was identified. The practical reasons for choosing an elementary school population are accessibility, time, and resources of the researcher, and more importantly, the expressed desire of the Virginia Beach school officials to have this study conducted.

An adaptation of the Zemke Needs Assessment for Computer Literacy Training model[22] and the Roberts Local Process of Change model[23] served as the basis for the development of this administrative microcomputer literacy training model and inquiry into the administrative microcomputer literacy training needs of the Virginia Beach school administrators.

Principles of effective staff development and educational change as well as implications from school improvements studies provided the theoretical framework for the process product training model developed for this study. The stated purposes of the study were accomplished by using this information combined with the results of the survey itself.

The primary focus of the model was to design administrative microcomputer literacy training that would increase school administrators' knowledge and skills in computer use and would effect and sustain the change to microcomputer use in schools. The following three separate survey instruments were designed for data collection: open-ended interview questionnaire, semi-structured pilot instrument, and structured survey instrument. The review of the related literature provided the information for the contents of each survey. Realizing that Virginia Beach school administrators' knowledge of computers was limited, open-ended questions were eliminated from the final structured survey instrument. Based on survey

responses, the training paradigm was designed for Virginia Beach elementary school administrators.

Background of the Virginia Beach City School System and Its Computer Educational Directives for the Twenty-first Century

The Virginia Beach City School System consists of 63 schools: 43 elementary (K-6), nine junior high (7-9), seven senior high (10-12), and four centers--vocational-technical, special education, career development, and gifted and talented.

The Virginia Beach City School System has the second largest student population in the state of Virginia. Over 60,000 students attend the schools, which are served by over 6,000 employees. The number of students, as of September, 1985, in elementary schools (K-6) is 32,000 and in secondary schools (7-12) is 27,000 students.[24]

In February 1981, the Virginia Beach City School Division formed a Curriculum Assessment and Development Task Force. The thirty-six member task force identified educational directions for the twenty-first century. The report established direction for actions that the Virginia Beach City School System should take to improve its current educational program.[25] The Computer Advisory Committee of the task force provided information that serves as a basis for continual study and development in the following areas: (1) a computer literacy program for kindergarten through grade eight, (2) an expanded high

school computer science program, (3) a plan for computer-assisted instruction, (4) a plan for computer-managed instruction, and (5) a plan for computer support for administrative tasks.

Under the computer support plan section of the report, the committee recommended the development and implementation of a plan for computer support for administrative tasks, such as grades, attendance, and recordkeeping. The members of the Computer Advisory Committee further recommended decision making in the following areas: (1) computer literacy implementation, (2) instructional application, (3) administrative application, (4) courseware selection, (5) hardware selection, and (6) staff development. In addition, the Futures and Technology Subcommittee identified the need for increased staff development in computer literacy and use of computer technology to gather, process, store, and retrieve increasing amounts of information.

On August 21, 1984, the Computer Technology Planning Group issued a status report which stated that a computer plan for instruction in the Virginia Beach elementary, junior high, and high schools will be written by Stanley Pogrow, a leading authority on educational uses of the microcomputer. Pogrow submitted a computer plan to the school division for approval in the late spring of 1985. In addition to the computer plan for instruction, Pogrow

also submitted an administrative computer plan for the junior high and senior high schools.

According to the status report, the administrative computer plan for elementary schools would be developed at a later date.[26] This latter recommendation has given Virginia Beach school officials an opportunity to begin planning and collecting information for training elementary school administrators in the use of microcomputers. Also, the Curriculum Assessment and Development Project Task Force Report and Computer Technology Planning Group Status Report contained valuable information which helped identify and exemplify the school system's philosophy and policy toward computer literacy which was useful to this study.

Definition of Terms

Administrative Computing. Use of the microcomputer as a management tool in performing administrative tasks, responsibilities, and practices.

Administrative Microcomputer Literacy Training. Training designed to increase school administrators' knowledge and skills in microcomputer use and to effect and sustain the change to microcomputer use in schools.

Administrative Microcomputer Training Needs. The administrative training needs are divided into areas of "knowledge" and "skills" pertaining to microcomputer use in schools.

Administrative Microcomputer Use. The effective and efficient utilization of computer application programs in school management.

Computer Illiteracy. A lack of "knowledge and skills" pertaining to microcomputer use in schools.

Computer Phobia. A fear of computers and personal resistance toward computer use.

"Mixed" Attitude Toward Administrative Microcomputer Use. In this study, a person having a "Mixed" attitude toward administrative microcomputer use was defined as having both positive and negative feelings toward microcomputer use.

"Frustrated Microcomputer User." In this study, a frustrated microcomputer user was defined by Zemke as a person who is the primary source of information about how things go wrong and on areas of training that are desperately needed.[27]

Microcomputer Innovation. Improvement of educational programs, administrative management, and educational services of schools through new uses of the microcomputer.

Microcomputer Literate School Administrator. The school administrator who is prepared for effective use and appropriate integration of microcomputers in schools.

School Administrative Management. The administrative processes in the management of schools, i.e., business and public service functions.

"Successful Microcomputer User." In this study, a successful microcomputer user was defined by Zemke as a computer user who can identify how computers can be used and the type of knowledge and skills that are needed to put them into use.[28]

Direction of the Study

In order to give meaning and context to the design and the methodology employed in this study, previous writings on educational computer technology in school administrative management were consulted. The feasibility and the applicability of administrative microcomputer use by school administrators has been demonstrated in many school districts in the United States and was reviewed for this study. The similarities that may or may not exist among schools in their administrative microcomputer use and in their microcomputer literacy training efforts have provided additional data for this study.

The direction of the study is represented by the following chapter headings and major subheadings: Chapter I--Introduction: Problem Statement, Purpose, Rationale, Methodology, Background of the Virginia Beach City School System and Its Computer Educational Directives for the Twenty-first Century, Definitions of Terms, and Direction of the Study. Chapter II--Review of the Related Literature: Computer Technology Overview, Theoretical Framework for Design of Administrative Microcomputer Literacy Training

Model, and Factors Affecting Administrative Microcomputer Use. Chapter III--Methodology: Research Questions and Hypotheses and Research Design. Chapter IV--Data Analysis: Survey Analysis Introduction and Presentation and Analysis of Data. Chapter V--Administrative Microcomputer Literacy Training Model, Summary and Conclusions: Planning for Support of School System Technology Innovation, Administrative Microcomputer Literacy Training Paradigm: Goals, Training Format, Change Strategies, and Conclusions and Future Implications.

ENDNOTES

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[6]Richard S. Podemski, "Educational Technology and the Development-Adoption Dilemma," Educational Technology 20 (May 1980):28.

[7]Christopher Evans, The Micro Millenium (New York: Viking Press, 1979), p. 126.

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[18]George McMeen, "Developing Computer Literacy Workshops for College Faculty," Educational Technology 24 (April 1984):28.

[19]Fredric L. Splittgerber and Norbert A. Stirzaker, "A Comprehensive Master Plan for Computer Utilization in Public School Districts," Educational Technology 24 (July 1984):18.

[20]Cutts et al., p. 54.

[21]G. W. Bonham, "Computer Mania: Academe's Inadequate Response to the Implications of the New Technology," Chronicle of Higher Education 26 (May 1983):72.

[22]Ron Zemke, "How to Conduct a Needs Assessment for Computer Literacy Training," Training 20 (September 1983): 25-31.

[23]Brown, pp. 17-30.

[24]A Guide to Virginia Beach Public Schools (Virginia Beach, Va.: Public Information Office), 1985-1986.

[25]Virginia Beach City Public Schools Task Force Report (Virginia Beach, Va.: Curriculum Assessment and Development, March 1983), pp. 1-88.

[26]Ibid., pp. 84-88.

[27]Zemke, p. 27.

[28]Ibid.

CHAPTER II

REVIEW OF RELATED LITERATURE

The literature review provides a theoretical framework to support the process product administrative microcomputer literacy training model developed in this study and a basis for survey inquiry and questionnaire content. The sections of the literature review are as follows: (1) Computer Technology Overview, (2) Theoretical Framework for Design of Administrative Microcomputer Literacy Training Model, and (3) Factors Affecting Administrative Microcomputer Use.

Computer Technology Overview

This section of the literature review provides an overview of technology advancement, microcomputer use in education and school administration, and administrative microcomputer use at the building level. In addition, the need for administrative microcomputer literacy training is discussed.

Daniel Bell, noted Harvard sociologist, coined the term "post-industrial society" to describe the industrial age transformation to an era based on services. Recently, it has become clear that the post-industrial world is not

only a service society but an information society--"one in which knowledge and the handling of information have elbowed aside the smokestack and the assembly line as symbols of America's prowess."[1]

Naisbitt states that this "megashift" from an industrial to information society occurred in 1956 and 1957. In 1956, for the first time, white collar workers outnumbered blue collar workers. According to Naisbitt, this spelled the decline of Industrial America and the birth of the "Information Age." In 1957, the Information Age spread worldwide as the Russians launched Sputnik, "the missing technological catalyst in a growing information society."[2] He is convinced that as the Industrial Revolution expanded the physical capabilities of humankind, the Information Age will enhance the mind power of humankind.[3]

The growth, collection, processing, storing and retrieval of information has transformed our society. Since 1940, the United States economy has been gradually changing until, by the mid-1970s, the American working population was predominantly engaged in the handling of information. In 1980, information workers constituted about 50 percent of U.S. workers, outstripping the service occupations (29%), industry (29%), and farm workers (4%). Of the nineteen million new jobs in the 1970s, only 16 percent were goods-producing jobs. Today,

60 percent of the American work force is employed in information-related jobs, as compared to 17 percent in 1950.[4]

According to Naisbitt, the greatest enemy of the information society is the information itself; it may drown the society. For example, six thousand scientific articles are written every day. Scientific knowledge increases thirteen percent yearly and doubles every five and one-half years.[5] Unlike the Industrial Revolution and its dependency on finite resources such as oil and iron, the new Information Age will be fueled by the limitless resource of knowledge and ideas.

Futurists like Kahn and Phelps at the Hudson Institute believe that "the next 10 to 20 years will be a period of continuing explosive progress in the informational technologies and that computers will be a major factor in changing from a service-oriented society to one in which much more activity will be accomplished by machine."[6] The restructuring of America from an industrial to an information society will require the use of new technology.

Americans are buying microcomputers at a rapid rate. In 1980, one-half million microcomputers were sold and experts predicted that there will be at least a 40 percent increase in sales each year. Estimates suggest that four million microcomputers were in homes by 1983.

Apple Corporation estimated that it sells 20,000 computers a month. The microcomputer is attracting users because of its relatively low cost, low operating expense, and availability for personal use. The capabilities of the microcomputer are expanding so rapidly that the functions of a $250,000 machine in 1968 can be performed by a $2500 machine today.[7]

The evidence of the increasing public enthusiasm in acquiring and using computers can also be seen in the growing interest to find out more information about computers. From 1979 to 1981, twelve new computer journals were established and the number of computer publications continues to increase. The number of computer clubs, users groups, and computer workshops is also steadily increasing across the nation.[8] This interest and enthusiasm by the public in acquiring and using the computer was officially recognized when Time magazine voted the computer "Man of the Year" in 1982.

Current Status of Microcomputer Use in Education

Despite the increasing interest in microcomputers, applying information technology to education lags behind developments in business, engineering, defense, and medicine. The microcomputer has made a significant impact in business, industry, and government but is much slower to penetrate the data-rich business of education. Anandam and Kelly confirm the gap that exists between the

spectacular sophistication found in communications technology and its underutilization in education. They report that the third generation computer--microcomputer--is appropriate for education and is becoming evident in schools; yet, the level of utilization by educators remains minimal.[9]

Data still remain scarce on the availability and use of microcomputers in schools. However, the number of computers in education has been steadily increasing since the 1960s. With the advent of the microcomputer into the marketplace in 1975, schools started to acquire this new technology in the late 1970s.

Although the utilization of microcomputers in education is new, we can expect in the next few years an exponential increase in the number being sold to school systems. The number of microcomputers in schools continues to multiply, computer companies and the software producers have entered the school market, and three major bills have recently emerged requesting federal support for school computer efforts. Congress approved, and the President signed into law, the Education for Economic Security Act, Public Law 98-377, which authorizes federal dollars to be spent on educational technology and technology-related products in 1985.[10]

The Ingersoll and Smith national survey of elementary and secondary teachers and administrators was conducted

in 1981/1982 and repeated in the 1982/1983 school year to monitor trends in the availability of microcomputers in American schools.[11] The data from these major surveys provide information about the availability of microcomputers in schools and are used for projecting future estimates of the penetration and growth of microcomputers in United States schools.

In 1982, according to the survey, a third of the responding teachers and administrators reported having only one microcomputer in their schools. Half of the respondents reported having more than two, and 7.5 percent of teachers and 4.8 percent of administrators replied that more than ten microcomputers were available in their schools. Using these figures, Ingersoll and Smith estimated that in the spring of 1982, there were 131,000 microcomputers in 25,350 schools.

To contrast, in 1983, 20 percent of the responding teachers reported only one microcomputer in their schools. More than half responded that their school had four or more, and more than 25 percent had nine or more microcomputers available in their schools. This means in schools nationwide, 40.1 percent currently own two or more microcomputers, 27.5 percent own 5 or more, and 14.6 percent own ten or more. From this information, Ingersoll and Smith estimated that by spring of 1983, there would be 333,000 microcomputers in 56,000 schools. This represents an increase of 154 percent over the previous estimate of the

number of microcomputers and an increase of 107 percent in the number of schools with microcomputers.[12]

On the same survey, school administrators were asked about their planned expenditures for microcomputers in the coming year. Approximately forty-seven percent said they intended to buy one or more, nineteen percent intended to buy a first machine, and another thirty-three percent planned to purchase additional microcomputers for an estimated 151,670 new machines. This represents an increase of 48.6 percent and at this rate of growth, the number of microcomputers in the schools will exceed 500,000 by the end of 1983/1984 and exceed one million by the end of 1985/1986 school year. By the end of 1983/1984, 83 percent of schools had microcomputers and by 1986 that figure should reach 96 percent.[13]

Of greater importance than the sheer numbers of microcomputers in schools is whether microcomputers are being used. Many schools have purchased microcomputers but are reporting underutilization. For example, Broward County school system in Pompano, Florida, purchased 900 microcomputers in 1983 under $2.1 million computer expansion program and after putting them into the schools, reported that under-used computers were not hard to find. In one elementary school within that system, only a few of its 520 students and 30 teachers had even tried the new machines.[14]

Luehrmann presents his analysis of the current status of the computer in education in the following statements:

1. The United States is the world leader in manufacturing micro-electronic hardware

2. Technology makes it possible today to deliver powerful personal computers to millions of individuals

3. The biggest single impediment to the future growth of this industry is the fact that the vast majority of Americans are uneducated in the use of a computer

4. To carry out the educational task ahead will require a substantial investment in research, development, planning, and delivery[15]

The third and fourth statements need not be viewed as a problem but should be seen as an opportunity to explore the relationships, effects, and possibilities of increasing computer use in education. To that end, this study provides an administrative microcomputer literacy training model, albeit designed for a specific population of elementary school administrators. The study further explicates the process that leads to such a design and may ultimately facilitate and support the use of microcomputers in schools.

Microcomputer Use in School Administration

In 1970, Zafirau reports that only 35 percent of the schools surveyed were using computers in administration; however, in 1975, fifty-three percent were using them.[16] In a recent Educational Research Service (ERS)

publication, School District Uses of Computer Technology, the results of a national survey of 1,484 school districts indicate that computer technology is used in 91.5 percent of the responding school districts. Computer technology is used for administrative purposes in 88.8 percent of the school districts. The microcomputer is used in conjunction with other computers in 65 percent of the districts, and 27 percent of the schools used only the microcomputer.[17]

The use of microcomputers for school administration is only beginning to be investigated. The Minnesota Educational Computing Consortium (MECC) conducted a study of the Minnesota school districts regarding the appropriateness of microcomputers as aids to schools and school administrators. In this study, an assessment was conducted of the needs, interests, current level of use, and existing and potential applications for administrative use of microcomputers in schools. The findings regarding the use of microcomputers for school administration were summarized by advantages and disadvantages.

Some of the advantages to microcomputing are "(1) cost of equipment, (2) cost of programs, (3) ease of operation, (4) ease of getting started, (5) multi-purpose use, (6) flexibility, and (7) local control." Some of the disadvantages are "(1) local operation, (2) maintenance of equipment, (3) lack of reliability, and (4) development of

integrated applications."[18] Thomas suggests that the advantages of using the microcomputer for school processes are its affordability, transportability, dedicated use, and increasing capability.[19]

In the ERS publication, School District Uses of Computer Technology, the factor most often listed as a major benefit of computer use is "decrease in time spent on routine tasks," followed by "information for planning and dissemination available more quickly." Most often stated as major problems of computer use are "staff not adequately trained," followed by "misunderstandings about the capabilities of computers," and "insufficient and inadequate software available."[20]

According to Morgan, computers are commonly used in school administration for basic clerical tasks, but have not received wide use in planning and evaluation. He describes such microcomputer use in the Cincinnati Public Schools. For example, the school uses a database of information on district's individual schools which allows users to compare schools, or groups of schools on many variables. The staff is also developing a multiple-variable computer program to simulate the effects of specific program intervention on a school variable.[21]

Computer programs such as these above can be used in school administration, but the success in using them productively depends on the training school administrators

receive in preparing them to use the microcomputers. Administrators in computerized school districts cite training opportunities as the most vital factor in implementing computer use.[22] There are many current and potential uses of computer programs and each program offers school administrators the opportunity to design systems that meet their specific needs.

Bernard Sidman, author of Educational Computer Technology: A Manual/Guide for Effective and Efficient Utilization by School Administrators, presents a sample of some computer applications presently being used by educational administrators.[23] Since this is such a new, yet growing field, some of his examples are listed in Appendix A for the readers' convenience.

In the State Plan for Computer Utilization in North Carolina Public Schools, some of the following computer applications at the building level are suggested: "(1) scheduling, (2) student database, (3) building inventory, (4) media inventory and circulation systems, (5) diagnostic and prescriptive programs, (6) word processing/mail lists, (7) classroom management, and (8) report cards."[24] Dennis presents the following list of some of the documents that can be generated from a student data base:

1. Course request tally list
2. Course request conflict list
3. Course conflict tables
4. Individual student course selections

5. Master schedule lists on classes, teachers, rooms, and periods
6. Room, teacher, and period conflict lists
7. Class size reports
8. Free period summaries
9. Unscheduled student lists
10. Student schedules
11. Class lists and grade report lists
12. Pupil attendance
13. Student grade forms
14. Excessive absence reports
15. Cumulative attendance lists
16. Failure-incomplete notices
17. Grade distributions by courses
18. Class rank lists
19. Honor roll lists[25]

The lists are constantly changing and new types of applications will continue to increase as school administrators gain more experience, confidence, and sophistication in using computer technology. School computer applications considered "Most Useful" in the management of elementary schools are identified in this study. The specific computer applications then became objectives within the administrative microcomputer literacy training paradigm.

Administrative Microcomputer Use at the Building Level

Microcomputers are beginning to be used at the school building level where it has not been practical to use the computer before. According to the report by the University of Alabama Center for Evaluation, most large and mid-sized school systems depend on mainframes or minicomputers in administration; but, in the near future, microcomputers will help manage the information burdens

at the building level as well.[26] Chase W. Crawford, a consultant for Management Information Services in the Florida Department of Education, points out that today the storage capacity of many microcomputers can equal that of the older, full-size computers.[27] This is not to suggest that the mainframe in the district offices should be replaced. Instead, there is a growing realization that many records are kept more accurately and in a more timely fashion, closer to the source of the data.

An exciting potential of the microcomputer at the building level is that it can be connected to large central computer systems to form "networks" for exchange of information and access to data files maintained in school districts' central offices. For instance, networking will make it possible to manage student attendance reporting, test scoring, and any recordkeeping activity at the school level and at times, merge this information into a student data base maintained at the district central office. Thus, the microcomputer can be used both as a self-contained computer or as a terminal to the mainframe computer. Perhaps the best of both worlds can be obtained through the "network" use of the microcomputer.

The ultimate goal of administrative microcomputer use may be the creation of "personal work stations." The personal work station concept proposed by Pogrow is a strategy for more effective utilization of the microcomputer for school administrative management. It means dedicating

specific microcomputers to specific administrators to assist administrators in the performance of specific work tasks.[28] The primary advantage of this concept would be the paperwork savings that results when school administrators directly interact with the technology. The "personal work station" concept is becoming commonplace in industry but has not been implemented in school management.

Need for Administrative Microcomputer Literacy Training

Sidman posits that the most significant aspect of the microcomputer is its effect on management and the role of the school administrator.[29] School administrators are engulfed with extensive and time-consuming requests and demands for information about such things as racial balance, class composition, teacher performance, and student progress. The demands and the time to respond to them will increase as school administrators are required to monitor their resources more closely.

David Marshall of the University of Manitoba, presenter at the Manitoba Association of School Superintendents' Conference, 1982, argues that school administrators' tasks are as demanding and complex as those in any business organization. He affirms that administrators are now looking for ways to release both themselves and their teachers from the routine clerical tasks and paperwork in order to provide more time for instructional matters.[30]

The microcomputer potential is presently available at a time when there is, according to Castetter, "hardly an administrator who will admit that he can secure, at any time and in proper form, the essential information he needs for the conduct of his work."[31] The use of the microcomputer will change the way schools operate and the way school administrators work.

Writing in the Computing Teacher, Sheila Cory, a coordinator of a staff development program evaluation for the Chapel Hill-Carrboro City Schools, North Carolina, explains that it is impossible for schools to know what to do with computers when their own school staffs do not know what computers can do.[32] Telem advances this thought even further by suggesting that if school administrators knew how to use the microcomputer to efficiently manage schools, it could lead to better attainment of schools' goals.[33]

To become microcomputer literate, school administrators need to be trained for the introduction and utilization of microcomputers in schools. Annison points out that educators' responsibilities are now greater than they have been in the past and that there will be no more great solutions coming from Washington. He states that "It will come down to your personal behavior today, tomorrow, next week, and next month."[34]

Cutts, Mathews, Winkle, and Nichols, founders of the Center for the Study of Microcomputers in Education at

the University of Mississippi, insist that administrator microcomputer literacy will be the challenge for the 80s. "To be leaders, administrators must be 'microliterate,' not to be barriers, they must be 'microliterate.' If they choose to be neither leaders nor barriers, they still need 'microliteracy' to understand the computer society in which they and their schools are functioning."[35] These authors also suggest that

> . . . with the coming of the microcomputers comes the need for 'microliteracy': awareness of, knowledge about, and programming experience with microcomputers. 'Microliteracy' must precede the effective and creative use of these machines as an administrator tool, a teacher tool, and a student tool.[36]

Unfortunately, computer literacy is one of those terms everyone seems to endorse in principle. However, everyone has his own definition, and yet nobody can define it in practice. This model attempts to define computer literacy and what it means to Virginia Beach school officials and elementary school administrators. The definitions described below provided information that this researcher used in exploring the topic of computer literacy with this study's population.

The definition of computer literacy is constantly changing much like the technology itself. Simply stated, computer literacy is knowing about computer technology. However, the knowledge and the skills needed to be considered computer literate are also changing as fast as the technology has advanced in the last few years. The

Educational Resources Information Center (ERIC) added computer literacy as an ERIC subject heading in 1982 and expanded the definition of computer literacy as an awareness or knowledge about computers to also include capabilities, applications, and limitations of computers.

Watt argues that mere knowledge concerning computers is not enough. What is needed is "a full range of skills, knowledge, understandings, values, and relationships to function effectively and comfortably in the computer-based society."[37] The components of his definition of computer literacy are as follows:

1. the ability to control and program a computer to achieve a variety of personal, academic, and professional goals
2. the ability to use a variety of pre-programmed computer applications in personal, academic, and professional contexts
3. the ability to make use of ideas from the cultures surrounding computer programming and computer applications as part of an individual's collection of strategies for information retrieval, communication, and problem solving
4. the ability to understand the growing economic, social, and psychological impact of computers on individuals and groups within our society and on society as a whole[38]

Brumbaugh implies that whatever the definition of computer literacy becomes, the primary focus should be on the individual within the organizations.[39] Molnar, who predicted in 1978 that computer literacy would become education's next challenge, states that local school leaders will have to define computer literacy themselves,

based on their identified training needs.[40] Computer literacy defined by any of these definitions is fast becoming a basic survival skill in the Information Age.

School administrators need to be microcomputer literate in order to assume an active leadership role in utilizing the microcomputer's potential for automating administrative tasks and for improving educational programs and services. Improvements in administrative efficiency are not likely to occur unless well-conceptualized administrative microcomputer literacy training models are developed to meet the identified microcomputer needs of school administrators.

Theoretical Framework for Design of Administrative Microcomputer Literacy Training Model

As discussed in Chapter I, the purpose of the study is to design a process product administrative microcomputer literacy training model. Subsequently, this section of the literature review presents perspectives on staff development and educational change and from school improvements studies that are particularly relevant to the development of this training model. In addition, perspectives on planning for implementation of training and expected outcomes are discussed.

Perspectives on Staff Development and Educational Change

The Rand study[41] revealed four findings which determine the effectiveness of staff development and

educational change programs that are particularly germane to the design of the computer literacy training model in this study. First, the Rand study states that institutional motivation must be high throughout the system for the innovation to succeed. Collaborative planning and involvement can result in commitment for and support of the innovation. The needs assessment process as well as the survey instruments developed for this study function as an information-gathering method of collaborative planning and involvement concerning administrative use of microcomputers.

The second finding of the Rand study is that successful programs appear to adopt two kinds of implementation strategies. The strategies include providing initial training activities for school personnel and then providing support for implementation over time. The administrative microcomputer literacy training model of this study was designed to develop training programs to increase school administrators' knowledge and skills in computer use and to effect and sustain the change to microcomputer use in schools. Thus, the model focuses on identifying microcomputer literacy training needs and factors affecting administrative microcomputer use. For example, identifying organizational factors that would facilitate the administrative use of microcomputers in schools can provide support for implementation over time.

The third finding is that institutional leadership is an important factor in the success of innovations. Leaders of change must be viewed as knowledgeable about computers, competent in using computers, and must be perceived as effective. Neill specifically reports that school administrators must be "knowledgeable about and supportive of technology" if this innovation is to succeed.[42]

In this study, a microcomputer literacy training model was developed for school administrators for several very important reasons. First, school administrators are viewed as leaders in schools. Second, school improvements begin and end with school principals. Last, with appropriate training and support for change provided, school administrators can become a needed catalyst in school system technology innovation.

The fourth important finding of the Rand study is that the most important single characteristic in successful program adoption appears to be the individual's sense of his own efficacy. Active learning, exploration, and use of microcomputers and software can support this sense of personal and professional growth. The sense of efficacy administrators receive is related to how well a training effort responds to the identified administrators' training needs. In this model an attempt is made to directly relate the identified training needs to training content. For example, the identified administrative

microcomputer literacy training needs become cognitive and proficiency goals of the training paradigm and also modules of instruction within the administrative training path.

The recent work of Fullan provides a theory of change that is particularly relevant to the application of microcomputers in schools. He suggests that the core of change stems from "an understanding of what reality is from the point of view of the people within the role."[43] Fullan explains, "What is required is multivariate thinking--attention to all factors that interact with each other in the change process."[44] The extensive Rand Corporation study of ongoing educational innovations by Berman et al. discussed in the preceding paragraphs supports the theoretical basis of examining a variety of interactive factors by suggesting that the course of a local innovation results from the interplay between the innovation, institution, and individuals.[45]

This interplay described by Berman is further conceptualized in Roberts' prime assumption that in the process of innovation at the local level, a mutual adaptation occurs.[46] Change occurs due to a variety of interactive factors including constraints, opportunities, incentives, and political considerations. Further, Roberts identifies potential barriers and facilitators of innovation that are particularly relevant to the application of microcomputers in school administration.[47]

The consideration of barriers and facilitators to microcomputer use along with school administrators' computer literacy needs are central to this study.

Perspectives from School Improvement Studies

Berman and McLaughlin state that "the principal is the gatekeeper of change. If you had to pick one figure in the school system who really matters in terms of whether you get change or not, it is the principals."[48] Current studies, such as Berman and McLaughlin, report that "the principal is the critical person in school improvement and that building level leadership is the single most important variable in changing an emphasis, setting a tone, and implementing a program."[49] The strong leadership from the principal is also noted as an important characteristic of effective schools described in "effective schools research."

To date, leadership for the microcomputer innovation in schools has been a grassroots movement. Advocacy for the utilization of microcomputers in schools has come from the university academicians, business leaders, and parent groups. The combined enthusiasm of individual teachers, parents, and students has forced the public schools to acquire microcomputers. Local decisions are being made about the purchase of microcomputers and about their use or nonuse with little district planning or administrative

microcomputer literacy training for educators in leadership positions in schools.

School administrators are in a position to "make or break" the microcomputer innovation in schools. Neill, Berman, and McLaughlin remind us that the principal has a key role in the microcomputer innovation's success.[50] Many experts agree that school administrators must become computer users in order to understand the power and potential of the microcomputer for improving educational programs, administrative management, and educational services of their schools. With appropriate microcomputer literacy training, the role of principals and/or assistant principals becomes a strategic position and possible catalyst to the use of microcomputers in schools. The training paradigm developed in this study was designed specifically for school administrators. The training was designed to respond to their identified needs, thereby providing school administrators with sufficient knowledge and skills to move into leadership roles for computer use in schools.

Miles and others have documented the conditions in schools that affect the possibilities for school improvement. Conditions that are relevant to the change to microcomputer use in schools are the need for leadership and the need for support.[51] Loucks defines the need for support to include assistance and support from school personnel, i.e., school district officials, teachers,

principals, and external people.[52] The need for policies, procedures, guidelines, and computer literacy goals at both the district and school level are seen as necessary for innovation to succeed. In this study, survey questionnaire items are designed to investigate the need for support and from where and whom it must come.

Effective school improvement also requires attention to factors such as providing ample material resources and rewards for work. In this study, specific survey questions are designed to address the issues of accessibility to microcomputers and incentives for microcomputer use. Lieberman and Miller emphasize that participation, support, incentives, rewards, resources, and the excitement of becoming more competent are all part of the needed conditions for school improvement.[53] The administrative microcomputer literacy training model of this study provides a process for participant involvement, gaining computer experience and proficiency, and enhancing professional growth opportunities. The training paradigm is designed to provide the necessary and appropriate support, incentives, and resources that would facilitate and support microcomputer use in schools.

Increased attention to providing support for change has been discussed or alluded to by many authors such as Naisbitt, Brown, Pogrow, and Neill.[54] The novelty of the technology has left educational staff developers searching for ways to bring computer literacy to school personnel.

Rebecca Corwin suggests that advantage be taken of the two decades of research on staff development and educational change and apply this knowledge to computer literacy training.[55] The administrative microcomputer literacy training model of this study applies principles of effective staff development and educational change, as well as implications from school improvement studies, in order to design effective microcomputer literacy training and support for change.

Perspectives on Planning for Implementation of Training and Expected Outcomes

Five attributes that can have an effect on the rate of adoption of innovations listed by Rogers and Shoemaker are "(1) relative advantage, (2) complexity, (3) triability, (4) observability, and (5) compatibility,"[56] and are explained below. These attributes provide insight into possible ways to improve implementation of the administrative microcomputer literacy training effort developed in this study.

The attribute relative advantage refers to how the innovation is perceived. Is this a better way of managing schools than the way we are doing it? At the present time, many school administrators see the microcomputer as an unnecessary administrative tool and of little value to them. For many, it is perceived to be something else that they have to do and learn. If the change to administrative computing is to be realized, it is necessary that

school administrators perceive it to be more valuable than the old way of running the schools. Thus, training must be designed that is relevant to school administrators' work, responsibilities, and practices.

Podemski affirms the need for computer users to realize the personal benefits of the microcomputer innovation; it creates a degree of "ownership" for the innovation.[57] The ownership is extremely important to school administrators who are in a position by the decentralized nature of education to "make or break" the microcomputer innovation in schools. They made individual judgments and decisions about the use of microcomputers in schools and choose to use or not use the technology for administrative functions.

The usefulness of the microcomputer and a degree of ownership for this innovation must be realized by school administrators. This can be accomplished by providing training that is relevant to the needs and tasks of Virginia Beach school administrators. The inclusion of intrinsic goals and change strategies in the training paradigm designed for this study can foster the sense of "ownership" needed for school administrators to put this technology to work in schools.

The opportunity for "hands-on" training has been reported in the related literature as essential to successful utilization of microcomputers in schools.[58] In this study, "hands-on" training is investigated as a learning style method through survey questions.

The complexity of an innovation affects the rate of adoption. Computers are seen as complex machines. Computer phobia and anxiety cannot be ignored. The training program must be designed to relieve, if not remove, these and other barriers found to affect the implementation of training and outcomes. In this training model, the barriers as well as potential facilitators to microcomputer use are identified and used in the design of the training paradigm.

The triability of an innovation involves the opportunities that are provided to experiment with the innovation. Adequate time to learn how to use microcomputers and whether microcomputers are accessible to the potential computer users become main concerns. Subsequently, the lack of time to learn how to use microcomputers and lack of accessibility to hardware in schools are assessed as possible barriers and potential facilitators to microcomputer use in Virginia Beach elementary schools. If such factors are verified by the research population of this study, possible implementation strategies may be providing inservice time for training as well as many opportunities for access to microcomputers.

The observability is the visibility of results to other people not involved in the innovation. School administrators using the microcomputer can motivate other school administrators by telling them of their experiences.

This study sought to incorporate recognition possibilities as a change strategy in the training paradigm designed for Virginia Beach elementary school administrators. Incentives and rewards identified as needed by this group of school administrators are also included in the training paradigm.

The last attribute that affects the rate of innovation is compatability. If indeed we are living in the computer age, everyone should be computer literate. School administrators need to be microcomputer literate in order to assume an active leadership role in utilizing the microcomputer's potential for automating administrative tasks and for improving educational programs and services. Improvements in administrative efficiency are not likely to occur unless appropriate microcomputer literacy training models are developed to meet the microcomputer needs of school administrators.

All of these attributes discussed above can affect the implementation of training and outcomes. Therefore, they are investigated in this study through survey questionnaire items. The findings will be used to design the administrative microcomputer literacy training paradigm for the Virginia Beach elementary school administrators. Thus, by design, this administrative microcomputer literacy training model has increased potential for providing appropriate, effective, and successful microcomputer literacy training efforts.

Bender and Church focused on several areas in addressing the impediments to successful implementation of computer training programs. The areas that are applicable to this study are the following:

1. To communicate performance standards
2. To provide strong and continual support for computer use in schools
3. To provide adequate resources to foster computer use
4. To provide rewards, incentives, and motivational procedures to encourage people to use microcomputers.[59]

These authors report that these factors can play a large role in determining the success or failure of training programs. Witthuhn states that if a positive impact of computer use in schools is to be achieved, district computer literacy goals are a place to start.[60] This study investigates the existence of and importance of having such goals.

In addition, the need for directions and guidelines in the form of policies and goals pertaining to computer use are investigated in this study. This researcher attempts to collect data pertaining to both district-level and school-level organizational factors that would influence microcomputer use. Based on these data, the extrinsic goals are established for the training paradigm.

In direct reference to providing adequate resources, rewards, incentives, and motivational procedures, Dean

Spitzer, president of High Impact Training Company, provided some implementation considerations for training in the form of problem solvers, some of which apply directly to this study. He suggests that school officials must make sure that there are appropriate incentives that encourage people to make the change to microcomputer use in schools and that there are sufficient resources available to assist implementation of computer use.[61] Johnson insists that technology is little understood by most existing school personnel who are functioning under time pressures and have been given little incentive to retool.[62] In this training model, survey questionnaire items are designed to collect information on desired facilitators and needed organizational factors that would facilitate and support administrative use of microcomputers in schools. Based on survey responses, the design of the administrative microcomputer literacy training paradigm will respond to these implementation considerations.

Investigation of the training needs and preferences of this study's population of school administrators provides further insight into possible ways to promote implementation of training and outcomes. Studies in preservice and inservice training programs such as Lawton and Gershner have shown that computer acceptance and successful implementation of computer technology was aided by participant involvement in the training design.[63] The model developed in this study involves potential

computer users in designing their own training through the needs assessment information-gathering and survey development processes outlined in Chapter III.

By designing training to meet the identified training needs and planning for implementation of training, the primary expected outcome of this administrative microcomputer literacy training model is microcomputer literate elementary school administrators. Other outcomes are increased computer proficiency, improved school district support for the change to microcomputer use in schools, and enhanced leadership for the microcomputer innovation in schools.

Microcomputers have the power and potential to help school administrators move into the Information Age. But this power and potential will not be realized until training and support for change are provided. Sources for generalizations concerning computer use are still too meager and most of the current training models are neither adequately conceptualized nor based on a sufficient amount of data.[64] Subsequently, this study has increased implications for computer literacy training because it is based on an extensive amount of collected data from potential computer users. In addition, this process product training model can enable school systems to design their microcomputer literacy training efforts and to plan for training implementation and outcomes.

Microcomputer literacy training models are becoming increasingly important to school district computer literacy training activities. Thus, the administrative microcomputer literacy training model designed in this study which was based on a thorough review of related literature and from responses by potential computer users can serve as a source for generalization. By design, it enables school officials across the country to plan and provide appropriate, effective, and successful computer literacy training efforts.

Factors Affecting Administrative Microcomputer Use

This section of the literature review focuses on factors that can create and inhibit microcomputer use in schools. These factors are discussed and grouped into computer literacy training needs and competencies, attitudes toward microcomputer use, and potential barriers and facilitators to microcomputer use.

Computer Literacy Training Needs and Competencies

Ted Mims of Louisiana State University and Jim Poirot of North Texas State University have identified school administrators' training needs concerning the educational applications of computers. They devised a total of 42 competencies, of which 38 were judged to be of "at least medium importance" for school administrators by a

group of ten authorities in the field of educational administration and by a panel of 31 educators and computer vendors. The ten competencies receiving the highest mean ratings are as follows:

1. Be able to justify the cost of educational computing
2. Have a working knowledge of computer hardware and software terminology needed to communicate with data processing or computer professionals
3. Be able to identify possible funding sources for instructional and administrative computing
4. Be able to identify training needs of teachers in the use of the computer as an object of instruction, as an instructional medium, and as a problem solving tool
5. Be able to demonstrate an awareness of future trends in computing as they relate to educational computing
6. Be able to describe the computer training needed by students
7. Be able to identify training needs of teachers and administrators related to the administrative uses of computers
8. Be able to identify various alternatives for using computers in instruction
9. Be able to discuss legal, moral, and human impact issues of computing, particularly as they relate to educational uses
10. Be able to identify administration tasks that could be computerized.[65]

The last desirable competency according to the evaluators was being able to program the computer; i.e., to write a simple program. In this study, these competencies are included in a survey questionnaire item pertaining to administrative microcomputer training needs.

Developing these computer literacy competencies is purported to be essential for school administrators. Each school district may require additional or more specific computer literacy competencies for their school administrators according to the district's definition and philosophy concerning computer literacy. In order for school districts to provide appropriate administrative microcomputer literacy training, opportunities to learn these competencies must be included in the design of training.

Estes and Watkins believe that administrators must become computer literate. They feel a school administrator should become "sufficiently literate" to be able to ask those who program information to do it according to their informational needs, to know the full range of computer capabilities of their schools.[66] The school administrators must be knowledgeable about administrative as well as instructional uses of the microcomputer and be able to explain computer trends to any and all interested people.

The need for school administrators to become computer literate coupled with computer proficiency appears necessary for microcomputer utilization in schools. Randhawa and Hunt, from the University of Saskatchewan, suggest that a positive orientation toward computers and skill in using them at a reasonable level of competence is inescapable now and for the future.[67] The importance

of developing a training model that can be adapted not only to school administrators but to the specific needs of specific school personnel within specific positions can contribute much to the understanding and utilization of microcomputers in schools.

Attitudes Toward Microcomputer Use

Changing technology combined with technological ignorance, fear, and obsolescence present stumbling blocks to the utilization of microcomputers in school administrative management. Earl comments that ignorance of computer technology could result in fear and antipathy which could expel curiosity, invention, and support needed to exploit its full potential.[68] In a recent newspaper article, Molnar reports that the nation is suffering from "scientific and technical illiteracy . . . an ignorance explosion."[69] "People are afraid of the new technologies," said Edward Cornish, president of the World Future Society, "They don't understand what's going on and don't even know what questions to ask."[70]

Professionals in education and human service agencies seem to resist the encroachment of computers and remain ambivalent and uneasy with the educational implications of the computer innovation.[71] Winkle and Mathews state that computers in education have encountered resistance primarily from unprepared school personnel. Most are fearful and reluctant to accept the technology.

This hesitancy displayed by teachers in computer-assisted instruction was named by researchers as the John Henry Effect: the fear of being beaten by the machine.[72] Some educators fear that they will be losing or forfeiting control to a machine. The intimidation of the computer itself and the accompanying language and culture affect many people in many different ways.

Billings commented that some educators are philosophically opposed to computer use because of the Orwellian 1984 image. The futuristic environment seems very threatening. They are afraid of "Big Brother" controlling them, their lives, and their work. Others refuse to get involved because they are convinced it is another fad like so many other educational innovations. Many educators feel that computers in education represent another gimmick that takes us away from the "basics." Some school administrators just simply don't want to bother learning another way and are willing to let the younger members of the staff take the responsibility.[73]

In the report by the University of Alabama Center for Evaluation, the two sources of resistance to computer use identified by educators are "lack of resident skills among educators" and "personnel resistance."[74] The attitude concomitant with a possible level of anxiety was researched for this study as well. School administrators must be willing to work with the microcomputer, and more importantly, want to work with this new technology. If this proper

attitude is missing, the technology will not be used, adapted, or integrated into the organization.

In the book The Micro Millenium by Christopher Evans, the psychological inhibitors that can influence the computer innovation are discussed. The psychological inhibitors are mainly the negative feelings about computers which can operate in the individual at a conscious or unconscious level. They are not tied to the computer per se but with an uneasiness with science and technology itself. Human inertia may be an inhibitor to the computer innovation. Political decisions are also seen as powerful forces which can inhibit computer use.[75] Consequently, many teachers and administrators have assumed the "wait and see" attitude toward the microcomputer innovation in the schools. School administrators in particular seem to expect and are waiting for more district direction before any action is taken at the school level.

Each of these inhibitors needs to be resolved in order to erase the uncertainty that can cause inactivity. This study sought to incorporate specific inhibitors into intrinsic and extrinsic goals for training as well as identify change strategies to minimize these constraints.

Several factors have been reported or suggested in the related literature as having an effect on computer attitudes. For example, according to a landmark study

conducted by Booz, Allen, and Hamilton, Inc., the factors of age and tenure were reported as having an effect on a person's receptiveness to computers.[76] In this study, a research hypothesis is formulated to investigate if age and tenure did in fact influence school administrators' attitude toward computer use.

Researchers Loyd and Gressard suggested that computer experience may be related to computer attitudes.[77] Subsequently, hypotheses are formulated in this study to explore the level of competence with microcomputers reported by school administrators and its effect on computer attitudes and training needs. Specific information obtained from these hypotheses is needed in the design of the training paradigm for this study. Training must be designed to respond to specific needs of specific groups of computer users. Separate training paths within the training paradigm may be needed to meet the expressed training needs of this study's population of school administrators.

Daryl Conner, a psychologist heading an Atlanta-based consulting company and leader in the area of managing change, explains that an increase in people problems and repercussions are surfacing from the introduction of technology into the workplace. He posits that people are generally reluctant to change their habits, and changes are often accompanied with confusion, frustration, and resistance. "These kinds of symptoms will

surface during the introduction of new technology, because important changes always require people to modify something about their attitudes and perceptions." Further, Conner adds "these emotional factors are seldom treated with appropriate training."[78] This study identifies the emotional factors operating within certain groups of school administrators when analyzed by such categories of computer experience as "Beginners" and administrators with a "Mixed" attitude toward microcomputer use. These factors are then taken into consideration when establishing intrinsic goals for the training paradigm.

Maccoby asserts that any new technology will be effective if there is a positive attitude among the individual workers who will use the technology.[79] School administrators must be willing to work with the microcomputer, and more importantly, want to work with this new technology.

Potential Barriers to Microcomputer Use

The most reported barrier in the related literature is the software gap. It is true that over the years the advances in hardware have not been matched by advances in software. However, the software and the courseware barriers have improved substantially in the administrative areas of microcomputer use. These barriers, operating in concert or individually, can have a braking effect unless the school administrator is trained in the administrative

as well as the instructional uses of the available software and courseware.

The resistance to automation is a barrier reported by many educators to the widespread use of microcomputers in building level administration.[80] Goodlad et al. point out that "many educational practitioners do not relish the prospect of automation" and that "there is also a serious lack of knowledge on the part of educators about the power and potential of computer systems for improving educational programs."[81] According to the Educational Administrator's Survival Guide to Administrative Uses of Microcomputers written by the Florida Department of Education, the major problems to educational administrators when they consider computerizing some of their office functions are "initial costs, computer literacy, computer phobia, and security."[82] Daniel Brown in his study, "The Change to Administrative Computing in Schools," reports that the major barriers to the move to school office automation are "computer illiteracy" and "computer phobia."[83]

The concept of automation must be treated as an improvement from the way things are done and must be seen by the school administrator as just that--an improvement. The computer may or may not reduce staff, but the fact remains that computerizing administrative tasks can decrease the time spent on the tasks and that time could be spent on more important matters related to instruction

or curriculum. Resistance to automation is investigated in this study as a possible barrier to the administrative use of microcomputers through the training needs assessment process developed for this study.

Educators are also susceptible to the "math anxiety" syndrome. Math anxiety is generally defined in the related literature as an insecurity about one's ability to work with numbers. The computer is seen by many as a mathematical machine; hence, the math anxiety transfers into computer anxiety. Bowman et al. suggest that actually the use of the microcomputer does not require all this mathematical ability and used creatively can free administrators from the routine paperwork.[84]

Education is a people-oriented business and educators have a tendency to avoid technology that seems impersonal. Many school administrators feel a loss of control as contacts with people are replaced by contacts with machines. However, in the related literature the fear of dehumanization dissipates in direct proportion to the amount of contact individuals have with the machines.[85]

Another barrier to computer use involves the issue of invasion of privacy. Jones and Dukes discuss the question of privacy and report that it can be solved easily by assigning passwords and user identification names to certain sections of the categorized information in addition to the regular password and user codes for access to program. Thus, privacy of the student is more

secure because only those who should have access to certain information would have such access, and some of the other general information on the program would be available for anyone needing it. For example, privacy issues surround the grade histories in the permanent records and for this reason the information could be given two passwords and codes. The second set of passwords and codes would keep that information more secure and available to certain personnel; whereas, parents' names and telephone numbers would be available to others who might need this information.[86] A survey questionnaire item was incorporated in this study to verify if security of information was a problem.

Brown identified the following potential barriers to microcomputer use in schools: "(1) the complexity of the computer; (2) the resource requirements [such as money, time, and effort needed to put the microcomputer to work]; and (3) the demand for understanding [the microcomputer]."[87] These barriers were investigated in this study through survey questionnaire items in order to identify the major barriers that could inhibit microcomputer use in schools.

Additional factors summarized from the related literature that must be considered in the change to microcomputer use in schools include the following: (1) insufficient and inadequate hardware in schools,

(2) inadequate computer resource school personnel, and (3) inadequate support from school boards, parents, and taxpayers. The barriers described above are investigated in the training needs assessment process of this study.

Some of the structural barriers identified by Pogrow that are likely to impede the large-scale use of technology in the public schools are as follows:

1. Inadequate capital resources for schools to purchase computers

2. No incentives for teachers [or school personnel] to use computers

3. Lack of computer literacy among current teachers and administrators.[88]

Sheingold and others reported the lack of time and energy of school personnel as a major barrier to computer use. Time is also seen as a critical issue in the implementation of training.[89] This study, through the development of survey questionnaire items, attempted to verify the barriers pertaining to lack of microcomputer literacy training for school administrators, accessibility to microcomputers, incentives to support the use of microcomputers, and time to learn how to use microcomputers.

Potential Facilitators to Microcomputer Use

The Roberts model adapted by Brown in his study of administrative computing in schools identified the following facilitators to microcomputer use: "(1) planning

[which focuses on the user]; (2) support [which indicates high-level endorsement and sufficient resource commitment]; (3) training [which allows for individual user differences]; (4) participation [which includes involvement of users]; (5) communication [which suggests strategies to reduce conflicts]; and (6) motivation [which includes professional growth opportunities and recognition possibilities]."[90] These facilitators are investigated in this study through the needs assessment process and survey questions.

People generally resist change when they do not understand the change and they perceive little benefit from the change. Possible change facilitators suggested by Kotter and Schlesmanger to deal with resistance include the following:

1. to educate people to change
2. to involve potential resistors in some aspect of the training design
3. to provide facilitation and support through training
4. to offer incentives to change
5. to use explicit or implicit coercion[91]

In this study, these strategies were researched for applicability to this group of school administrators and assisted this researcher in designing appropriate training.

Yarrish presents the following strategies to implement the use of computer technology in organizations:

1. Increase the learning opportunities for people to understand this technology

2. Increase the rate and amount of direct, hands-on computer exposure for all employees

3. Make people more valuable than the machines

4. Institute a learning process where mistakes are treated as opportunities and not reasons for criticism[92]

Data collected from this study's population of school administrators on possible facilitators that would support administrative use of microcomputers were used to develop change strategies for the administrative microcomputer literacy training paradigm in this study. Information collected on training preferences also assisted this researcher in developing change strategies.

The responses of school administrators to the survey questionnaire items pertaining to training needs, attitudes toward microcomputer use, barriers, facilitators, and organizational factors affecting administrative use of microcomputers, and training preferences and learning styles are used to develop goals, a training format, and change strategies in the training paradigm designed for this study. Thus, the training paradigm based on the review of the related literature and survey responses will be presented and discussed in detail in Chapter V.

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CHAPTER III

METHODOLOGY

This chapter is divided into the following sections: (1) Research Questions and Hypotheses and (2) Research Design. Discussion of the administrative microcomputer literacy training needs assessment, administrative microcomputer literacy training paradigm, and survey data collection methods is included in the research design section of this chapter.

Research Questions and Hypotheses

The specific research questions addressed in this study are as follows:

1. What are the administrative microcomputer literacy training needs of Virginia Beach elementary school administrators?

2. What is the prevailing attitude toward administrative use of microcomputers among Virginia Beach school administrators?

3. What are the barriers that influence administrative use of microcomputers?

4. What are the current and desired facilitators that would support administrative use of microcomputers in schools?

5. What are the district-level organizational factors that would facilitate and support the use of microcomputers in schools?

6. What are the school-level organizational factors that would facilitate and support the use of microcomputers in schools?

7. What are the training preferences of Virginia Beach elementary school administrators?

8. What is the preferred learning style of Virginia Beach elementary school administrators?

The specific hypotheses developed for this study are as follows:

1. There is no difference in responses of school administrators by their indicated level of competence with microcomputers to the identified administrative microcomputer literacy training needs.

2. There is no difference between Virginia Beach elementary school administrators' attitude toward administrative use of microcomputers and age or years in position.

3. There is no difference between Virginia Beach elementary school administrators' attitude toward administrative use of microcomputers and indicated level of competence with microcomputers.

4. There are no differences in responses by position of principal or assistant principal to the indicated facilitators that would influence administrative use of microcomputers.

The findings are incorporated in the development of goals, training format, and change strategies for the administrative microcomputer literacy training paradigm designed for Virginia Beach elementary school administrators.

Research Design

The research population was a total of 87 elementary administrators: 43 principals and 44 assistant principals in the 43 elementary schools in Virginia Beach, Virginia. An adaptation of both the Zemke Needs Assessment for Computer Literacy Training model[1] and the Roberts Local Process of Change model[2] provided the framework for the development of the needs assessment process in the administrative microcomputer literacy training model designed for elementary school administrators of Virginia Beach, Virginia.

Ron Zemke, research editor of Training, suggests that organizations with more than fifty employees would be better served with a clearly-focused and articulated approach to computer literacy training. The needs assessment approach is critical, states Zemke, "to the ability to analyze needs effectively and prescribe training

precisely."[3] Thus, the major elements of the research design include the administrative microcomputer literacy training needs assessment process, design of administrative microcomputer literacy training paradigm, and survey data collection methods.

Administrative Microcomputer Literacy Training Needs Assessment Process

The purpose of this study is to design a process product administrative microcomputer literacy training model for 43 principals and 44 assistant principals in the Virginia Beach elementary schools. In order to accomplish this purpose, a systematic process for assessing administrative microcomputer literacy training needs is required. The training needs assessment process includes the identification of the following: (1) administrative microcomputer literacy training needs, (2) school administrators' attitudes toward microcomputer use, (3) barriers and facilitators influencing administrative use of microcomputers, (4) organizational factors needed to facilitate and support administrative use of microcomputers in schools, and (5) school administrators' training preferences and learning styles.

Currently, microcomputers are raising some of the following questions in the schools: What are the administrative microcomputer training needs of school administrators? How can school administrators realize some of the promise of increased productivity? How can

they avoid the fear, uncertainty, and other difficulties that accompany the microcomputer innovation in schools?

Described below is an adaptation of Zemke's five-step proactive needs assessment for computer literacy training used in this study which employs several information-gathering steps to build a working draft of what microcomputer literacy means to school administrators, and, more importantly, what it will mean in a training effort.

Step one: Information-gathering process

Zemke suggested that the first step in planning computer literacy training is to assess what computer literacy means to that organization. Therefore, it was critical to identify the Virginia Beach City School System philosophy and policy toward administrative computing and computer literacy in general. A staff development specialist assigned to computer planning was interviewed for information on what computer literacy means to the Virginia Beach School System now and in the future. Local perspective was gained by discussing how the microcomputer was expected to benefit Virginia Beach elementary schools and school administrators. Survey questions included the following: What can the microcomputer accomplish in elementary school management? What is the future for administrative use of microcomputers in Virginia Beach

elementary schools? What is the policy toward administrative computing?

Step two: Review of related literature

In this step, a review of the related literature was undertaken to gather information on the microcomputer innovation in public schools, the administrative use of microcomputers, and computer literacy training programs for school administrators. This step was necessary to formulate appropriate questionnaire items to establish in part the content validity of the survey instruments.

Step three: Open-ended interview questionnaire

Information from step one and two was used to develop the survey instruments. The needs assessment information-gathering procedure involved the use of the following survey instruments: open-ended interview questionnaire, semi-structured pilot instrument, and structured survey instrument.

The review of the related literature provided a conceptual framework for the formulation of open-ended questions for preliminary investigation. The purpose of the open-ended interview questionnaire was to provide the researcher with unanticipated concepts and local perspective. The open-ended questionnaire items also served as a beginning point in identifying the administrative microcomputer training needs of Virginia Beach elementary school administrators.

The open-ended interview questionnaire was administered to four Virginia Beach elementary school administrators applying Zemke's two identified categories of microcomputer users. The two categories of administrative microcomputer users were the "successful administrative users" and the "frustrated computer strugglers." The Director of Planning, Assessment, and Resource Development Services and the staff development specialist, previously interviewed, of the Virginia Beach City Schools, forwarded the names of two "successful computer users" and two "frustrated computer strugglers" for this researcher to interview. The personal interview lasted one hour or less. The answers were written on the questionnaire by the researcher and further elaboration and discussion of responses promoted for clarification purposes.

From these successful administrative microcomputer users, the researcher was able to find out what computers can do for administrative school management in Virginia Beach elementary schools and the types of skills and knowledge needed to make the microcomputer an administrative tool. The microcomputer literate elementary school administrators had many personal learning stories to report. Some questions to this group included the following: What are the skills needed to make the microcomputer an administrative tool? What do you see as

disadvantages to administrative computing? If you were to start all over again . . .?

The two frustrated administrative microcomputer strugglers interviewed added their perspective so that the final structured survey instrument was able to clearly identify the administrative microcomputer training needs. The unsuccessful users were a good source of information about how things go wrong and provided valuable insight into the attitudes, expectations, and frustrations of the administrative microcomputer user in Virginia Beach elementary schools. Questions to this group were as follows: What are the barriers to administrative use of microcomputers? What are your specific training needs to make the microcomputer an administrative tool? What do you expect from the district in response to administrative computing? What do you see as the future of administrative use of microcomputers in Virginia Beach elementary schools? The Open-Ended Interview Questionnaire is found in Appendix B.

Step four: Semi-structured pilot instrument and structured survey instrument

In this step, the development of the semi-structured pilot instrument and the structured survey instrument took place. The semi-structured pilot instrument was also exploratory and used to refine the structured survey instrument. The pilot instrument included an open-ended

response for most of the questionnaire items and concluded with a section for comments.

The population for the semi-structured pilot instrument was 18 graduate students enrolled in an educational administration course at Old Dominion University. Since the total population of this study was 87 school administrators, a more than ten percent representative sample was reflected in the 18 graduate students selected as the population for the semi-structured pilot instrument. Those graduate students were enrolled in post-graduate degree programs in educational administration and some hold administrative or supervisory positions with an area school system. The demographic information in the semi-structured pilot instrument served to verify the pilot group's position to make valid responses, suggestions, and judgments.

The purpose of the structured survey instrument was to collect information from the 43 principals and 44 assistant principals in the Virginia Beach elementary schools. The final survey instrument contained responses that had to be rated or selected by respondents. The open-ended responses to the questions and the comment section were omitted from the final survey instrument. Subsequently, the structured survey took less of the school administrators' time. In addition, the use of rated responses enabled the researcher to test for substantial

differences between questionnaire items and demographic information.

The face validity of the final survey instrument was obtained by (1) designing survey questionnaire items from an extensive review of the literature, such as ERIC searches, a computer control abstract search, and a microcomputer abstract search; (2) interviewing the staff development specialist assigned to computer planning and two Virginia Beach elementary school principals or assistant principals from each category of administrative microcomputer user--successful microcomputer user and frustrated microcomputer user--to gain local perspective in the survey question items; and (3) utilizing responses from interviews and comments from the pilot population to refine the survey instrument.

The semi-structured pilot instrument and the structured survey instrument were divided into these four sections: (1) demographic and usage information; (2) school administrator's attitude toward the administrative use of the microcomputer; (3) barriers, facilitators, and organizational factors influencing administrative microcomputer use in schools; and (4) administrative microcomputer training needs and training information. Some of the questionnaire items in section one, demographic and usage information, included years in position, educational background, age, gender, and race. Particular questionnaire items on level of competency with

microcomputers and number of hours of computer training were also used in the demographic and usage section.

The Wright and Stone questionnaire[4] contains statements eliciting attitudes about different aspects of microcomputers. This format and several statements from this study were used in section two, school administrator's attitude toward the administrative use of microcomputers. Statements from the Lichtman study[5] were also included for comparison purposes, such as surveyed educational administrator's attitude in 1979 compared with the surveyed attitude of Virginia Beach elementary school administrators in 1985 on selected statements.

For example, in the structured survey instrument, survey respondents were asked to rate statements according to this scale: SA, indicating strongly agree; A, agree; D, disagree; and SD, strongly disagree. Statements that measured the attitude of the administrator toward the administrative use of the microcomputer included the following:

SA A D SD 1. A person cannot escape the influence of computers.
SA A D SD 2. Computers dehumanize society by treating everyone as a number.
SA A D SD 3. Computers can be a management tool.
SA A D SD 4. I can't get enough time on our microcomputers.
SA A D SD 5. Our school needs more microcomputers.
SA A D SD 6. Microcomputers make me feel uncomfortable.

Using items of both directions provided more variety and breadth in the items, made the items more interesting, and

prevented response sets, such as picking all middle-of-the-road responses.[6]

In section three of the semi-structured and structured survey instruments, the barriers and facilitators influencing administrative microcomputer use in elementary school administrative management were assessed. The questionnaire items were based on the Brown study, which applied the Roberts' Local Process Change Model,[7] and identified potential barriers and facilitators of innovation at the local level. Based on this model, the following questions were asked with identified barriers and facilitators as possible responses: What do you perceive as barriers influencing the administrative microcomputer use? Which of the following facilitators would influence the administrative use of microcomputers?

The generalizability of this study and policy recommendations were furthered through the use of the following two questions concerning organizational factors that would support microcomputer use in schools: Viewing your school environment, how supportive are the following factors to utilization of microcomputers in the schools? As you see it, which of the following organizational conditions are needed to support the change to administrative computing in the schools?

In section four, administrative microcomputer training needs and training information, some of the following questions requiring responses rated on a Likert

scale were presented: Indicate your preference to training topics by circling either very important, somewhat important, or not important and, using a scale from 1 to 3, write a 1 beside those administrative microcomputer applications that would be most useful to you in the management of your school, 2 beside the useful applications, and 3 beside the least useful application. In addition, several questions eliciting a yes or no response will be used. For example, Indicate your preference to the following computer literacy training questions dealing with format, trainers, and when to offer the training.

Specific questions pertaining to respondent's learning style were also incorporated in this section. This effort was included in an attempt to match the elementary school administrator's learning style and his microcomputer training needs with an appropriate training format and change strategies. The Structured Survey Instrument is found in Appendix C.

Step five: Information-collection process

In this step of the microcomputer training needs assessment process, the administrative computer literacy training paradigm for Virginia Beach elementary school administrators was developed and outlined below. The review of the related literature, an adaptation of the Zemke Needs Assessment Process and the Roberts Local Process

of Change model, and the data collected from survey instruments provided the information needed to structure the administrative microcomputer literacy training paradigm to meet the identified training needs of the 43 school principals and 44 assistant principals in Virginia Beach elementary schools.

This information enabled this researcher to establish goals and devise a training format that took into account the identified training needs and preferences of Virginia Beach elementary school administrators. Change strategies were also developed from this information and included in the administrative microcomputer literacy training paradigm to facilitate and support the use of microcomputers in schools. Data from all sections of the structured survey instrument were used in designing the training paradigm for elementary school administrators of Virginia Beach, Virginia.

Design of Administrative Microcomputer Literacy Training Paradigm

Specific tasks to be accomplished in the design of the administrative microcomputer literacy training paradigm for the 43 principals and 44 assistant principals in Virginia Beach elementary schools are as follows: (1) to establish cognitive, proficiency, intrinsic, and extrinsic goals; (2) to devise a training format; and (3) to develop change strategies that would facilitate and support the use of microcomputers in schools.

The microcomputer innovation in the elementary schools connotes change. Innovation is seen as changing the way things are done; altering the job tasks, responsibilities, and practices; as well as threatening individual competence, confidence, and performance. Therefore, inquiry into the change process surrounding the administrative microcomputer use in schools was needed to design the administrative computer literacy training paradigm. The principals and assistant principals are persons in key roles capable of facilitating or impeding change. Administrative microcomputer literacy training can only be designed, implemented, and realize outcomes if it focuses on the innovation, institution, and individuals who must make the change.

In order to design administrative computer literacy training to meet the identified microcomputer training needs of the 43 principals and 44 assistant principals in the Virginia Beach elementary schools, several administrative computer literacy training efforts conducted nationally provided a basis from which to begin structuring this training. Of particular interest to this study were the goals, training format, training preferences, and change strategies used in the models surveyed in the literature and described below.

Goals

The goals for the administrative microcomputer literacy training paradigm developed in this study include

cognitive, proficiency, intrinsic, and extrinsic goals. Some cognitive goals have been identified in the related literature and found in many computer training efforts. The proficiency goals have not been identified as such in computer training efforts but are discussed as competencies and skills needed by potential computer users. The label of proficiency goals is established by this researcher because of the need for computer users to become proficient in using the computer so it will be used in the school environment. Both the cognitive and proficiency goals are formulated from the survey questionnaire item on training needs, which is divided into two areas pertaining to knowledge and skills in microcomputer use.

The staff of the Center for the Study of Microcomputers in Education at the University of Mississippi designed a one-day workshop to begin to meet the microcomputer training needs of the 50 educational leaders in northern Mississippi. Some of the cognitive goals identified in this training effort involved being able to "(1) list educational uses of microcomputers for administrators, teachers, and students; (2) write a computer program; and (3) list factors to consider in selecting microcomputers in education."[8] These cognitive goals provided the knowledge about microcomputers that the Mississippi educators felt they needed and most

participants felt they had achieved a high level of attainment of the goals.

On the basis of designing goals from training needs and the reported success of the Mississippi model, these cognitive goals (training needs), along with others collected from the needs assessment process, are included in the survey questionnaire item on training needs administered to Virginia Beach school administrators. Data collected from the survey from the knowledge area pertaining to training needs are used to develop cognitive goals for the administrative microcomputer literacy training paradigm designed for Virginia Beach school administrators.

Ted Mims of Louisiana State University and Jim Poirot of North Texas State University identified several competencies that school administrators should have concerning the educational applications of computers.[9] These competencies seemed to represent the skills needed by school administrators to put microcomputers to work in schools. Some of the following skills needed by school administrators and adapted from these competencies are included in the survey designed for this study's population to assess the training needs in the skill area as well as the knowledge area of computer use. For example, the ability to identify the computer training needs in schools, the ability to implement computer use in schools, and the ability to program data according to informational needs

are training needs the Virginia Beach school administrators must prioritize.

In addition, Stanley Pogrow recommends goals such as the development of the capability to make decisions about the purchase and use of computer systems and the development of skills in the use of computer application programs to be included when training school administrators in administrative use of microcomputers.[10] Information collected from the survey skill area pertaining to training needs was used to formulate the proficiency goals of the training paradigm designed for Virginia Beach elementary school administrators.

The inclusion of the above goals in this study's administrative microcomputer literacy training paradigm depended on how the Virginia Beach elementary school administrators report these goals as being important training needs. This researcher advances the view that only by establishing goals from identified training needs of potential computer users will training be relevant, effective, and successful. Thus, the cognitive and proficiency goals of the administrative microcomputer literacy training paradigm provide Virginia Beach elementary school administrators with training that will increase their knowledge and skills in computer use.

From the review of the related literature, it becomes clearly apparent that intrinsic and extrinsic goals to computer literacy training had not been thoroughly explored

or applied to computer literacy. Miskel discusses the intrinsic-extrinsic distinction in educational organization by defining intrinsic goals to include feelings of autonomy, achievement, competence and confidence in one's ability, and extrinsic goals to include recognition, money, and promotion.[11] Inclusion of these goals by this researcher in the training paradigm designed for elementary school administrators of Virginia Beach, Virginia, adds new knowledge to the training efforts in computer literacy.

Specifically, the intrinsic goals were developed from responses to survey questionnaire items pertaining to attitudinal words selected by Virginia Beach school administrators. The extrinsic goals were established from identified organizational factors that would facilitate and support the use of microcomputers in schools. The intrinsic and extrinsic goals of the administrative microcomputer literacy training paradigm provide Virginia Beach elementary school administrators with training that will effect and sustain the change to microcomputer use in schools.

Training Format

The Virginia Microcomputer Inservice Training Task Force Report[12] stresses that educators have different abilities, interests, and levels of competencies which must be met in the design of training. For example, the task force suggests three components of training--basic

literacy, utilization, and specialization--which could function as the framework from which to begin structuring training to meet identified administrative microcomputer training needs of school administrators. The Virginia Beach school administrators' responses to the survey questionnaire item pertaining to training needs are assessed in order to provide a framework from which to structure the training components and modules of instruction.

Further, a survey questionnaire item on the structured survey instrument asks Virginia Beach school administrators to indicate their level of competence with microcomputers by selecting either the beginner or experienced category. The level of competence indicated by school administrators is then analyzed in reference to the prioritized training needs. This data served as a starting point in determining if differing training levels would be necessary in the design of the training paradigm.

The Secrist model[13] provides a means of viewing a stratified computer user society by categorizing the participants according to certain training concerns. By considering possible groupings of participants and categorizing needs, computer training can be provided that meets the identified needs of all participants. If collected data indicate that a stratified user society exists among the principals and assistant principals in

Virginia Beach elementary schools, the Secrist model will be employed.

Some of the following computer literacy training models were reviewed for applicability in determining training format that may meet the identified needs of Virginia Beach elementary school administrators. The outline of the Microcomputer Staff Development Program for staff members of the Downers Grove North High School, Illinois,[14] served as an example of training components and possible modules of instruction for the administrative microcomputer literacy training paradigm designed for Virginia Beach elementary school administrators. The program presented sessions which included a thorough introduction to the microcomputer, peripherals, and beginning basic programming; a concentrated approach to the educational applications of computers; and a specific approach to computer software application for specific purposes.

In Telem's model,[15] a training program was presented based on the premise that administrators and teachers should receive a common basis that would introduce them to computer technology and then the training paths would split, focusing on relevant uses to the administrative or instructional system. The use of the administrative path in this model was embodied in the administrative microcomputer literacy training paradigm for elementary school administrators in Virginia Beach, Virginia.

Change Strategies

The change strategies used at Cuyahoga Community College, Cleveland, Ohio,[16] for helping college administrators become computer literate have been given careful consideration in the design of administrative computer literacy training for Virginia Beach elementary school administrators. The cuyahoga Administrative Literacy Project addressed two similar issues of this study. The two issues were the possible anxiety that administrators had concerning computer technology and the spectrum of computer applications available to computer literate administrators to assist them in performance of their job tasks, responsibilities, and practices.

The key to their success appeared to be making the technology available for college administrators to use at home. This was investigated as a possible change strategy in the design of the microcomputer literacy training paradigm for Virginia Beach elementary school administrators.

In addition, suggestions and guidelines from several sources, such as the Alabama Center for Evaluation's technical report on administrative use of microcomputers, were consulted in developing change strategies. This report offered some of the following suggestions for developing training for administrative use of microcomputers: "(1) the technology to be taught should be utilized in inservice sessions, (2) hands-on experience is a prerequisite

to mastery, and (3) small-group instruction is seen as optimal."[17]

Staff development and computer literacy are concerns of the unprepared educators as they face new demands of the Information Age and advances in computer technology. This administrative microcomputer literacy training model for elementary school administrators of Virginia Beach, Virginia, employed valid and relevant methods and efforts in identifying and responding to the identified microcomputer literacy training needs of this group of potential computer users.

Survey Data Collection Methods

The structured survey instrument was administered to a total population of elementary school principals and assistant principals and not a sample from the population. The mode of data collection was a mailed survey to 43 principals and 44 assistant principals in Virginia Beach elementary schools.

An advance communication memo from the Office of Planning, Assessment, and Resource Development Services, Virginia Beach City Schools, apprised the elementary school principals that this researcher would be conducting an administrative microcomputer training needs assessment. A cover letter written by the Director of Planning, Assessment, and Resource Development Services which accompanied the survey identified the purpose of the survey

and the importance of responding to the survey (see Appendix D). The respondents were given a deadline for returning the survey. A response rate in excess of 75 percent was expected and achieved.

In order to accomplish the purpose of this study--to design a process product administrative microcomputer literacy training model--it was crucial that a valid and reliable survey instrument be developed (see Appendix C). Consequently, in addressing the problems of nonresponse to the mailed survey, considerable attention was given to the instrument itself. The final structured survey instrument was reduced 65% in size and assembled into a booklet form. This format for the survey was selected because of its attractiveness to the respondents and because it would require less time to complete.

The researcher followed up nonrespondents by using a simple identifying code written on the survey. The sequence of events outlined by Fowler,[18] with some modification, was used for repeated contact with nonrespondents:

1. About seven days after initial mailing, all nonrespondents were mailed a reminder, emphasizing the importance of the study and of a high rate of response.

2. About five days after the reminder was mailed, if there still remained some nonrespondents, the initial letter and survey was mailed again to nonrespondents.

3. If the response rate was still not satisfactory, the Director of Planning, Assessment, and Resource

Development Services, Virginia Beach City Schools, was contacted concerning the nonrespondents. He telephoned the nonrespondents for the information.

The analysis of responses to the structured survey instrument was conducted using descriptive statistics. The survey responses were analyzed in both the actual questionnaire form and collapsed form for more comprehensive evaluation and reporting of the findings. The analysis of the survey responses included percentages and rank orderings indicated by the intensity of certain areas reported by the respondents. Differences that existed between demographic information indicated by respondents and their responses to rated survey questionnaire items were reported on the basis of percentages. A more detailed description of data analysis is presented in Chapter IV.

ENDNOTES

[1]Zemke, pp. 25-31.

[2]Brown, pp. 19-21.

[3]Zemke, p. 31.

[4]B. D. Wright and M. H. Stone, Measurement as An Instrument of Learning, Final Report (Washington, D.C.: National Institute of Education, January 1983), pp. 1-148.

[5]David Lichtman, "Survey of Educator's Attitudes Toward Computers," Creative Computing 5 (January 1979): 48-50.

[6]William Wiersma, Research Methods in Education (Itasca, Ill.: F. E. Peacock Publishers, 1980), pp. 223-224.

[7]Brown, pp. 17-30.

[8]Cutts, p. 56.

[9]Neill, p. 51.

[10]Committee Report by John R. Hoyle, Norman Bell, Richard Podemski, and Stanley Pogrow, American Association of School Administrators Conference, July 20, 1981.

[11]Cecil G. Miskel, "Motivation in Educational Organization," Educational Administration Quarterly 18 (Summer 1982):68.

[12]Virginia Department of Education, Microcomputer Inservice Training Task Force Report, Richmond, Virginia, July 1983, pp. 1-14.

[13]L. S. Secrist, "How to Keep Users Happy and Keep Your Sanity," Computer Decisions 12 (February 1980):93.

[14]Larry Bowers, "The Impact of Microcomputers on Secondary School Administrators," in The Tomorrow in New Technology: Frontiers in Administrative Computing (Washington, D.C.: AEDS, 1982), pp. 151-154.

[15]Telem, "Must Computerization Fail in Schools? Training Needed," p. 20.

[16]Sam Spero and Jon Jonas, "Computer Literacy for Educational Administrators," in The Tomorrow in New Technology: Frontiers in Instructional Computing (Washington, D.C.: AEDS, 1982), pp. 1-15.

[17]Alabama Center for Evaluation, The Administrative Use of Microcomputers, Technical Report, pp. 8-9.

[18]Floyd J. Fowler, Jr., Survey Research Methods (Beverly Hills, Calif.: Sage Publications, 1984), p. 54.

CHAPTER IV

DATA ANALYSIS

This chapter is divided into the following sections: (1) Survey Analysis Introduction and (2) Presentation and Analysis of Data. Based on the findings presented in this chapter, an administrative microcomputer literacy training paradigm is designed and presented in Chapter V.

Survey Analysis Introduction

The analysis of the survey responses includes percentages and rank orderings. Tables are used to present the structured survey findings. Pairs of responses found within the survey such as 'Strongly Agree' and 'Agree' and 'Strongly Disagree' and 'Disagree' were combined into an Agree/Disagree dichotomy. Data were analyzed in both actual questionnaire form and collapsed form for comprehensive reporting of the findings. The tables show the responses in either or both forms in order to clarify and help distinguish the level of agreement in certain questionnaire items.

Presentation and Analysis of Data

The following presentation and analysis of data constitutes the quantitatively selected responses of surveyed elementary school administrators in the Virginia Beach elementary schools as obtained from the computer analysis. Of the 87 elementary school administrators, 74 responded to the survey; of those respondents, 35 were principals and 39 were assistant principals. The findings are arranged according to the following divisions: Demographic and Usage Information, Administrative Microcomputer Literacy Training Needs, and Factors Affecting Administrative Microcomputer Use.

Demographic and Usage Information

Demographic and usage survey response data

A demographic profile of Virginia Beach elementary school administrators is presented in Table 1. This profile could be important to school system officials reviewing this study for its representativeness and generalizability. If other school systems have school administrators with similar profiles, then possibly the administrative microcomputer literacy training model for elementary school administrators of Virginia Beach, Virginia, would have increased relevance.

As described in Table 1, 97% of the Virginia Beach elementary school administrators are white, with 46% in

TABLE 1

PROFILE OF VIRGINIA BEACH ELEMENTARY SCHOOL ADMINISTRATORS--PERCENTAGES*

Personal Characteristics	School Administrators: Principals %	Principals n	Assistant Principals %	Assistant Principals n	Total Percent Responding %	Total Percent Responding n
1. Race						
White	97	29	97	36	97	65
Nonwhite	3	1	3	1	3	2
TOTAL	100	30	100	37	100	67
2. Age						
26-35	0	0	31	12	16	12
36-45	43	15	49	19	46	34
46 and over	57	20	20	8	38	28
TOTAL	100	35	100	39	100	74
3. Years in position						
1-4	26	9	61	23	44	32
5-10	17	6	34	13	26	19
11-15	20	7	5	2	12	9
16 and over	37	13	0	0	18	13
TOTAL	100	35	100	38	100	73
4. Educational background						
Liberal Arts	57	20	55	21	56	41
Science/Math	23	8	11	4	16	12
Other	20	7	34	13	28	20
Total	100	35	100	38	100	73
5. Gender						
Male	69	24	46	18	57	42
Female	31	11	54	21	43	32
TOTAL	100	35	100	39	100	74
6. Level of competence with computers						
Beginner	66	23	58	22	62	45
Experienced	34	12	42	16	38	28
TOTAL	100	35	100	38	100	73

TABLE 1--Continued

Personal Characteristics	School Administrators: Principals %	Principals n	Assistant Principals %	Assistant Principals n	Total Percent Responding %	Total Percent Responding n
7. Hours of computer training						
None	11	4	5	2	8	6
6 or less	57	20	49	19	53	39
7-12	9	3	18	7	14	10
13-18	17	6	20	8	19	14
Over 18	6	2	8	3	7	5
TOTAL	100	35	100	39	100	74

*Note: Percentages may not equal 100% due to rounding of figures.

the age group 36-45 years, followed by 38% in the 46 and over age range. Forty-four percent of the school administrators have been in their position for 1-4 years, followed by 26% in the 5-10 years category. The majority of the elementary school administrators have a liberal arts background, while only 16% have a science/math educational background. As the responses show, 57% of the elementary school administrators are male.

In assessing the level of competence with microcomputers, the "Beginner" category accounts for 62% of the school administrators, while the "Experienced" level accounts for 38% of the respondents. Over half of the respondents reported having 6 hours or less of computer training. A closer examination of Table 1 shows that 8% of the school administrators have had no training, 53% have had 6 hours or less, 14% have had 7 to 12 hours of training, 19% have had 13 to 18 hours, and only 7% over 13 hours of computer training.

Analyzing the demographic data and their relationship to training, differences in the potential trainees must be identified. Table 1 shows that in this population of Virginia Beach elementary school administrators, principals are older and have been in their position longer than assistant principals.

In regard to training, the Virginia Beach elementary school principals and assistant principals are different

in age and years in position, but not in hours of computer training or indicated level of competence. Subsequently, a single administrative training path designed to include both principals and assistant principals is considered as an appropriate training format in the administrative microcomputer literacy training paradigm.

Additional survey response data

Of importance to this study is the number of microcomputers that were reported in the Virginia Beach elementary schools. The number of microcomputers in the schools ranged from 1 to 16 microcomputers. Of the responses, four, five, and six microcomputers were indicated most often. A discrepancy existed between the principal and assistant principal's assessment of the number of microcomputers in the school. This is a possible indication that communication needs to be improved and roles clarified at the school level as to who is responsible for computer use in schools.

Survey data also revealed a discrepancy in school administrators' knowledge of written district goals for school administrators' computer literacy. To the survey question, "Does your district have written goals for school administrators' computer literacy?" 28% of the respondents indicated that there were district goals.

Forty-one percent of the school administrators reported that there were no goals, and the remaining 31% indicated that they did not know if such goals existed.

A closer examination between the responses of principals and assistant principals revealed that 42% of the assistant principals and only 18% of the principals reported they did not know if such goals existed. One explanation for assistant principals' lack of knowledge concerning district administrators' computer literacy goals may lie again in the district's communication processes and procedures governing this particular school administrative position.

Establishing and communicating the district administrators' computer literacy goals and possible role responsibilities for computer use in schools may, in fact, be one of the identified contributing factors that would facilitate the use of microcomputers in Virginia Beach elementary schools. Because of the effect such lack of knowledge could have on training, additional inquiry concerning the existence of such goals was undertaken.

When this researcher followed up on the existence of such goals, Virginia Beach school district officials responded that such goals did exist. Upon viewing the goals, they were found to be in recommended form, lacking in definition, specificity, and measurable terms.

Administrative Microcomputer Literacy Training Needs

Training needs survey response data

Research question number one:

What are the administrative microcomputer literacy training needs of Virginia Beach elementary school administrators?

Table 2 shows the administrative microcomputer literacy training needs ranked by importance. The administrative training needs were grouped by seven knowledge areas and seven skills areas. All of the training needs used in the structured survey instrument were obtained from the related literature. In Table 2, the seven knowledge area training needs are listed. The respondents were asked to rate the training needs as 'very important,' 'somewhat important,' and 'not important' in training school administrators for implementing microcomputer use in schools.

The most important training needs indicated as 'very important' by over 80% of the Virginia Beach school administrators were Knowledge of instructional uses of microcomputer (85%), Knowledge of administrative uses of microcomputers (84%), and Knowledge of computer capabilities and constraints in education and school administration (81%). Over 60% reported the training need, Knowledge of peripheral devices, i.e., printers,

TABLE 2

ADMINISTRATIVE MICROCOMPUTER LITERACY
TRAINING NEEDS--PERCENTAGES

Training Needs	Responses: Very Important %	Very Important n	Somewhat Important %	Somewhat Important n	Not Important %	Not Important n
Knowledge Area						
1. Knowledge of instructional uses of microcomputers	85	62	14	10	1	1
2. Knowledge of administrative uses of microcomputers	84	61	16	12	0	0
3. Knowledge of computer capabilities and constraints in education and school administration	81	59	18	13	1	1
4. Knowledge of peripheral devices, i.e., printers, modems, etc.	63	46	37	27	0	0
5. Knowledge of how to evaluate administrative software	58	42	38	28	4	3
6. Knowledge of how a computer works and basic concepts of use	48	35	40	29	12	9
7. Knowledge of historical background of instructional and administrative computing	16	12	36	26	48	35

TABLE 2--Continued

Training Needs	Responses: Very Important %	Very Important n	Somewhat Important %	Somewhat Important n	Not Important %	Not Important n
Skill Area						
1. Ability to implement computer use in schools	75	54	25	18	0	0
2. Ability to use a variety of software programs in personal, academic, and professional contexts	74	53	25	18	1	1
3. Ability to identify computer training needs in schools	68	49	32	23	0	0
4. Ability to program data according to informational needs	65	47	32	23	3	2
5. Ability to list factors to consider in making hardware and software decisions	44	32	51	37	4	3
6. Ability to acquire trouble-shooting skills for computer use	32	23	56	40	12	9
7. Ability to write a computer program	28	20	47	34	25	18

modems, etc., as 'very important.' Fifty-eight percent of the school administrators responded that Knowledge of how to evaluate administrative software was 'very important.'

The training need, Knowledge of how a computer works and basic concepts of use, was considered 'very important' by less than half of administrators (48%). The least reported training need, Knowledge of historical background of instructional and administrative computing, was reported by only 16% of respondents as 'very important.' The relative unimportance of this training need may be due to the perceived emphasis of theory over the practical uses of microcomputers in education. Because of less than 50% of 'very important' responses by school administrators to the training needs of Knowledge of how a computer works and basic concepts of use and Knowledge of historical background of instructional and administrative computing, these needs were eliminated from the training design.

Table 2 shows the responses in the category of training needs identified as skills. The number of respondents indicated 'very important' over 'somewhat important' was larger in four of the six items. The four training needs considered 'very important' by school administrators are as follows: Ability to implement computer use in schools (75%); Ability to use a variety of software programs in personal, academic, and professional contexts (74%); Ability to identify computer training needs

in schools (68%); and Ability to program data according to informational needs (65%). The training need, Ability to list factors to consider in making hardware and software decisions, was indicated 'very important' by 44% of school administrators. Only 32% of school administrators indicated 'very important' to Ability to acquire trouble-shooting skills for computer use. The training need receiving the least amount of 'very important' responses was the Ability to write a computer program.

In regard to training, the training needs receiving less than 50% of the school administrators' responses of 'very important' were eliminated from the training design. However, if into this training effort an evaluation of progress indicates more interest in the training needs of Ability to list factors to consider in making hardware and software decisions, Ability to acquire trouble-shooting skills for computer use, and Ability to write a computer program, they can be added as modules in the administrative training path.

Interestingly, the knowledge training need pertaining to how to evaluate administrative software was indicated as 'very important' by 58% of the school administrators. The skill training need of being able to list factors to consider in making hardware and software decisions was reported as 'very important' by only 44% of the Virginia Beach school administrators. This may be interpreted that Virginia Beach school administrators want school district

personnel, possibly the district computer coordinator, to evaluate administrative software for school use.

A contradiction does appear in the percentage of school administrators' responses of 'very important' to the skill training needs pertaining to the Ability to use a variety of software programs in personal, academic, and professional contexts (74%) and Ability to program data according to informational needs (65%) as compared to the training need of Knowledge of how a computer works and basic concepts of use (48%).

Additional inquiry into this apparent contradiction was conducted by this researcher. Several elementary school administrators were asked to express an opinion as to the reason for these percentage differences. They recalled a recent training effort presented by a contracted computer vendor that was very technical in nature and lacked any practical application of computers to education or school administration. The training basically presented how the computer works. The school administrators interpreted the training need, Knowledge of how a computer works and basic concepts of use, to be much like the training received.

The Virginia Beach school administrators are verifying the situation reported in the related literature that computer literacy training must be relevant and applicable to administrative needs, tasks, responsibilities, and practices. In the related literature, the Ability to write a computer program was seldom seen by educators as a

training need. This fact was also verified in this study's population.

The knowledge training needs are used to establish the cognitive goals and the skill training needs become the proficiency goals of the administrative microcomputer literacy training paradigm. In addition, the cognitive and proficiency goals become the modules of instruction within the administrative training path.

Hypothesis number one: There is no difference in responses of school administrators by their indicated level of competence with microcomputers to the identified administrative microcomputer literacy training needs.

The data revealed that the "Beginner" and "Experienced" level of computer user indicated the same training needs. This data combined with the reported no differences between principals and assistant principals in hours of computer training or indicated level of competence with microcomputers resulted in the design of a single administrative training path within the training paradigm. Based on the data, the administrative microcomputer literacy training path is initially planned without differing training levels.

Additional survey response data

Table 3 displays the relative importance of 17 specific computer applications that could aid the school

TABLE 3

SCHOOL COMPUTER APPLICATIONS RANKED BY RESPONSES TO "MOST USEFUL"—PERCENTAGES (n=74)

School Computer Applications	Responses "Most Useful"
Group I--Most Useful	
1. Keep school inventory control data	82
2. Count/Report Attendance	81
3. Keep special education/IEP records	74
4. Schedule teachers	69
5. Write/Edit reports, letters, etc.	65
Group II--Useful	
1. Monitor school budget/accounting files	61
2. Report student testing scores	60
3. Keep school library records	55
4. Count/report student fees	54
5. Maintain student cumulative records	53
6. Maintain discipline file	49
7. Schedule students	49
Group III--Least Useful	
1. Print mailing labels	42
2. Keep teacher personnel records	35
3. Plan bus routing	31
4. Evaluate student/teacher performance	24
5. Monitor cafeteria meal selection	4

administrator in his or her administrative tasks. The responses were analyzed and grouped into the following three categories of administrative computer applications: Most Useful, Useful, and Least Useful, by the percentage of responses to "Most Useful" to the applications. The most useful applications indicated by elementary school administrators are as follows: Keep school inventory control data (82%), Count and report attendance, (81%), Keep special education/IEP records (74%), Schedule teachers (69%), and Write/edit reports, letters, etc. (65%). The following applications are considered useful to school administrators: Monitor school budget/accounting files (61%), Report student testing scores (60%), Keep school library records (55%), Count and report student fees (54%), Maintain student cumulative records (53%), Maintain discipline file (49%), and Schedule students (49%). The least useful applications are as follows: Print mailing labels (42%), Keep teacher personnel records (35%), Plan bus routing (31%), Evaluate student/teacher performance (24%), and Monitor cafeteria meal selections (4%).

Some other applications written into the survey by school administrators as important are the following: Keep special grouping of students, Schedule reading groups, Report child study team information, Keep clinic records, and Maintain free/reduced lunch information.

The computer applications considered "Most Useful" by Virginia Beach elementary school administrators are

included in the training paradigm by becoming objectives in the administrative training path described in Chapter V.

Factors Affecting Administrative Microcomputer Use

Attitudinal survey response data

Research question number two:

> What is the prevailing attitude toward administrative use of microcomputers among Virginia Beach elementary school administrators?

The Virginia Beach elementary school administrators reported an overwhelmingly positive attitude toward the administrative use of microcomputers. Seventy percent of the school administrators have a "Positive" attitude toward the administrative use of the microcomputer, 29% indicated "Mixed," and only 1% reported having a "Negative" attitude. As reported in the related literature, many educators have negative and mixed feelings concerning computer technology for education. The negative attitude has not been verified in this population, but the mixed attitude toward computers has been reported.

This "Mixed" attitude toward administrative use of microcomputers indicated by 29% of Virginia Beach school administrators cannot be overlooked when designing appropriate training. The findings support the conclusion that the administrative microcomputer literacy training paradigm designed for Virginia Beach elementary school

administrators does not need to focus on changing negative feelings about computers to positive feelings but instead on changing the mixed feelings reported by the elementary school administrators (29%) to positive feelings toward the administrative microcomputer use. A reassessment of Virginia Beach school administrators' attitude toward administrative use of microcomputers must be conducted after training to determine if the percentage of responses of mixed attitude have been reduced, and further, if the percentages of responses of positive attitude have been increased.

Hypothesis number two: There is no difference between Virginia Beach elementary school administrators' attitude toward administrative use of microcomputers and age or years in position.

Examination of Table 4 shows that each age category contained both "Positive" and "Mixed" attitude responses. The negative attitude was reported by only 1% of the respondents and is not a factor in analysis. Table 5 shows the Virginia Beach school administrators' attitude toward administrative use of microcomputers by years in position. No difference was obtained between years in position and attitude. According to a landmark study conducted by Booz, Allen, and Hamilton, Inc., the factors of age and tenure were reported as having an effect on a person's receptiveness to computers.[1]

TABLE 4

ATTITUDE TOWARD ADMINISTRATIVE MICROCOMPUTER USE BY AGE--PERCENTAGES

	Age Groups							
	26-35		36-45		46 & over		Total Percent Responding	
Attitude	%	n	%	n	%	n	%	n
Positive	67	8	68	23	74	20	70	51
Negative	0	0	3	1	0	0	1	1
Mixed	33	4	29	10	26	7	29	21
TOTAL	100	12	100	34	100	27	100	73

TABLE 5

ATTITUDE TOWARD ADMINISTRATIVE MICROCOMPUTER USE
BY YEARS IN POSITION--PERCENTAGES

	Years in Position									
	1-4		5-10		11-15		Over 15		Total Percent Responding	
Attitude	%	n	%	n	%	n	%	n	%	n
Positive	66	21	84	16	63	5	62	8	69	50
Negative	0	0	5	1	0	0	0	0	1	1
Mixed	34	11	11	2	37	3	38	5	29	21
TOTAL	100	32	100	19	100	8	100	13	100	72

This apparently is not the case with this study's population. Even with reported differences in school administrators' age and years in position, these differences did not affect their attitude toward computer use. One reason may be because these factors of age and years in position are no longer seen as explanations for delay, inactivity, and/or personal resistance to computers. The reality of the situation is apparent; computers are now a part of our society and our schools.

Hypothesis number three: There is no difference between Virginia Beach elementary school administrators' attitude toward administrative use of microcomputers and indicated level of competence with microcomputers.

There is a difference between school administrators' attitude toward microcomputer use and indicated level of competence with microcomputers. The vast majority of school administrators that have a "Mixed" attitude toward the administrative use of microcomputers indicated the "Beginner" level of competence.

The prevailing theme in the related literature is that educators must have a positive attitude toward computers and even further, Goodson suggests that principals' attitude toward and knowledge of computers will come from their use of computers.[2] Thus, this researcher concludes that by providing training designed to increase computer proficiency with microcomputers, the

school administrators indicating a beginner level of competence with microcomputers and a mixed attitude will become more experienced and thus, exchange the mixed attitude for a positive one. Subsequently, training may have more of an effect on a person's receptiveness to computers than factors of age and years in position reported in the review of literature.

Additional survey response data

Conners suggests in the related literature pertaining to change within the context of training that emotional factors must be treated with appropriate training.[3] Table 6 shows the responses of Virginia Beach elementary school administrators to the attitudinal question, "When you think of the word 'microcomputer' what words best describe your feelings?" The responses cited most often by agreement are Receptive (99%), Useful (99%), Innovative (95%), Challenged (93%), Change (93%), and Creative (93%). Responses cited most often by disagreement are Hostile (100%), Panic (96%), Dumb (94%), and Old (94%).

Of interest to the study are school administrators' responses and percentages of agreement to the following words: Motivated (79%), Excitement (76%), and Unprepared (64%). Other responses and percentages of disagreement that are of interest are as follows: Indifference (90%), Fear (89%), Threatened (89%), Fad (84%), and Too Complicated (81%).

TABLE 6

OVERVIEW OF RESPONSES TO ATTITUDINAL WORDS--PERCENTAGES

Attitudinal Words	Responses			
	Agree		Disagree	
	%	n	%	n
Positive Attitudinal Words:				
1. Receptive	99	71	1	1
2. Useful	99	71	1	1
3. Innovative	95	69	5	4
4. Challenged	93	69	7	5
5. Change	93	67	7	5
6. Creative	93	66	7	5
7. Motivated	79	57	21	15
8. Excitement	76	55	24	17
9. Unprepared	64	42	36	24
Negative Attitudinal Words:				
1. Hostile	0	0	100	68
2. Panic	4	3	96	65
3. Dumb	6	4	94	64
4. Old	6	4	94	64
5. Indifference	10	7	90	62
6. Fear	11	8	89	62
7. Threatened	11	8	89	62
8. Fad	16	11	84	59
9. Tense	17	12	83	58
10. Too Complicated	19	13	81	57
11. More Work	26	18	74	51
12. Pressure	29	20	71	48
13. Confused	31	22	69	48

Analysis of the school administrators' responses to the attitudinal words verified the overwhelming positive attitude reported earlier in this chapter. Examination of the responses to attitudinal words by position, indicated level of competence with microcomputers, whether an administrator owned a microcomputer, and attitude toward the use of microcomputers was conducted for applicability to planning appropriate training that would respond not only to the needs of the majority of school administrators of this population but also to the needs of the minority. Specifically, these findings are used in designing the intrinsic goals for the training paradigm.

Looking at responses by position, a difference was noted in the attitudinal word Motivated. More assistant principals were motivated toward microcomputer use than were principals. With assistant principals being a younger, less experienced group of administrators, they may be more eager and perhaps motivated because the computer is definitely a part of their future. This finding suggests to this researcher one of the implications of this study discussed in Chapter V, which is to assign the responsibility of computer use in the schools to a position of leadership; namely, the assistant principal position.

Training could be designed to specifically respond to this leadership and organizational issue of responsibility for computer use in the schools. Assigning a position the

responsibility for computer use in schools and providing training opportunities for existing position holders and potential position holders would facilitate the use of microcomputers in schools and certainly assist the implementation of training.

Investigation of indicated level of competence by responses to attitudinal words is important because 60% of the elementary school administrators reported the "Beginner" level of competence with microcomputers. Training must respond to the needs of the school administrators indicating the "Beginner" level of competence with microcomputers.

The responses to the attitudinal words, Motivated, Unprepared, Confused, and Too Complicated were found to be different when analyzed with the indicated levels of competence. The responses show that more of the school administrators indicating the "Experienced" level of competence reported the word, Motivated. These data suggest that motivation may come from training and many opportunities to use the microcomputers.

More administrators in the "Beginner" level reported the words, Unprepared, Confused, and Too Complicated than did the administrators in the "Experienced" level. Training must be designed to respond to the needs of the "Beginner" level of users by making them feel prepared and competent. Providing computer training and many opportunities to learn to use the microcomputer may result in dispelling the

feelings of complexity surrounding the microcomputer and its use in improving educational programs, administrative management, and educational services of schools.

Analyzing the data concerning owning a microcomputer and the responses to attitudinal words add support to the change strategy of providing many opportunities for access to microcomputers. For example, a difference was obtained from owning a microcomputer and attitudinal words of Too Complicated and Unprepared. No school administrators who owned a microcomputer reported the word, Too Complicated; and fewer administrators who owned a microcomputer indicated the word, Unprepared, than did the administrators not owning one. This finding supports the need to plan for accessibility and use of microcomputers in the training paradigm designed for Virginia Beach elementary school administrators.

Of particular importance in addressing the needs of the school administrators who indicated a "Mixed" attitude toward the use of microcomputers are the responses to the attitudinal words of Tense, Confused, Fear, Too Complicated, and Fad. The school administrators with the "Mixed" attitude toward the administrative microcomputer use indicated 'Yes' more often to these attitudinal words than the administrators with a "Positive" attitude.

Although the "Mixed" attitude toward administrative microcomputer use was indicated by approximately 30% of Virginia Beach school administrators, training must be

designed to address the specific needs of this group of school administrators as well. Again, the change strategies of providing many opportunities for access to and use of microcomputers and "hands-on" training will meet the needs expressed by this minority. The intrinsic goals and change strategies for the administrative microcomputer literacy training paradigm are designed to relate directly to these needs.

Also of interest to this study is that Virginia Beach school administrators indicated either total agreement or disagreement to selected statements taken from the Lichtman[4] and Wright and Stone[5] studies. In addition, the Virginia Beach school administrators indicated a more positive, receptive, and enthusiastic attitude about computers than did the educators surveyed in the above studies. The attitude differences of educators reflected in these studies toward various aspects of microcomputer use may be from exposure, societal pressure, or readiness to respond to this new technology for education.

It is expected that current and future studies will now be verifying the attitude change of acceptance toward computers rather than resistance toward computers. This trend needs to be explored further through additional studies.

Barriers survey response data

Research question number three:

What are the barriers that influence administrative use of microcomputers?

Table 7 displays the major barriers influencing administrative use of microcomputers in ranked order of importance. The principals and assistant principals responded similarly to the barriers. Attention to responses by position is important in establishing generalizability of this training model for use in responding to the specific needs of specific school personnel in specific positions to effect change. The two most reported barriers to administrative use of microcomputers are Computer illiteracy (93%) and Lack of administrative microcomputer literacy training (85%). The Insufficient number of microcomputers in schools (71%) was reported as the third most important barrier by Virginia Beach school administrators.

Initial start-up costs was indicated as a barrier by 69% of school administrators and 67% reported Computer phobia as a barrier to administrative microcomputer use. Over 60% of Virginia Beach school administrators saw Complexity of computers and Amount of time to learn how to use microcomputers as barriers. The software gap discussed repeatedly in the related literature was reported by only 60% of school administrators as a barrier to administrative use of computers. The two least reported barriers were

TABLE 7

BARRIERS TO ADMINISTRATIVE USE OF MICROCOMPUTERS--
PERCENTAGES

Barriers	Responses			
	Agree		Disagree	
	%	n	%	n
1. Computer literacy	93	68	7	5
2. Lack of administrative microcomputer literacy training	85	63	15	11
3. Insufficient number of microcomputers in schools	71	52	29	21
4. Initial start-up costs	69	51	31	23
5. Computer phobia	67	49	33	24
6. Complexity of computers	66	48	34	25
7. Amount of time to learn how to use microcomputers	62	44	38	27
8. Lack of appropriate software	60	44	40	29
9. Resistance to automation	48	35	52	38
10. Security of information problems	38	27	62	44

Resistance to automation (48%) and Security of information problems (38%).

The major problems to educational administrators when they consider computerizing some of their office functions as cited in the related literature are initial costs, computer literacy, computer phobia, and security problems.[6] Brown confirms two of these barriers--computer illiteracy and computer phobia--in his study of two school districts working with administrative applications.[7] Computer illiteracy was seen by Virginia Beach elementary school administrators as a major barrier influencing administrative use of microcomputers. However, Computer phobia was replaced in importance with Lack of administrative microcomputer literacy training.

The barrier, Insufficient number of microcomputers in schools, was reported by this study's population as more influential to administrative use of microcomputers than Initial start-up costs and Computer phobia. Several authors, such as Pogrow and Moursund,[8] in the review of related literature, have also reported that an insufficient number of microcomputers in schools was a barrier to the adaptation of computers in education and educational administration.

The response data of Virginia Beach elementary school administrators also reflect differences in the importance of Security of information as a major problem or barrier to administrative use of computers. Security of information is

considered an obstacle to computer use in the literature review by authors Jones and Dukes, among others.[9] The lack of importance to security and privacy issues by Virginia Beach school administrators may be, as Jones and Dukes suggest, because such issues can be solved easily by passwords or access codes and restrictions or from a lack of awareness of the problems that may be encountered through the use of computers.

Of particular interest to this study is that Resistance to automation was indicated as a barrier to administrative use of microcomputers by only 48% of Virginia Beach school administrators. The resistance to automation has been cited in the literature review as a major barrier to the widespread use of the microcomputer in building level administration. This barrier is of little importance to Virginia Beach school administrators.

The percentages of responses by Virginia Beach elementary school administrators to the survey questionnaire item pertaining to barriers influencing administrative use of microcomputers have validated some of the barriers reported in the literature review. The lack of importance attached to some of the reported barriers may be because of the rapid infusion of technology into our homes, schools, and jobs. Some barriers may be viewed now as unnecessary and even impractical. According to former U.S. Secretary of Education T. H. Bell, a major trend toward more use of computers by

Americans is not difficult to discern. "Computers are in the classroom, computers in industry, computers in our workplaces are just going to be commonplace."[10] Training can no longer be overlooked in support of technology.

Perhaps computer illiteracy will always be reported as a major barrier to computer use. A commitment to computer literacy training is needed to respond to the barrier of computer illiteracy. However, computer phobia may not be a barrier to computer use in the future. Computer familiarity and use may be the reasons the fear is dissipating. Computer experience may also be a factor contributing to more positive computer attitudes.

Knowledge of the barriers that influence administrative use of microcomputers reported by Virginia Beach elementary school administrators helped this researcher design training that minimizes if not overcomes these barriers. In reference to designing administrative microcomputer literacy training for Virginia Beach elementary school administrators, training must respond specifically to the identified barriers concerning Complexity of computers and Amount of time to learn how to use microcomputers, which were indicated by over 60% of school administrators.

Additional analyses of the reported barrier of Amount of time to learn how to use microcomputers with responses of school administrators owning a microcomputer resulted in a closer look at those who owned one. More school

administrators who owned a microcomputer reported disagreement to this as a barrier influencing the administrative use of microcomputers; whereas, more administrators who did not own a microcomputer reported this as a barrier.

This information suggests that more opportunities for computer access and use may overcome this reported barrier. Change strategies designed for the training paradigm can specifically respond to the issue of computer accessibility. Access to microcomputers must be provided during and after the training effort. The instructional training content must also relate to the Virginia Beach school administrator's tasks, responsibilities, and practices. In addition, the knowledge of the barriers to computer use is helpful for Virginia Beach school officials in addressing the organizational barriers that are impeding the use of microcomputers in schools.

Facilitators survey response data

Research question number four:

> What are the current and desired facilitators that would facilitate and support administrative use of microcomputers?

Table 8 displays responses regarding the facilitators currently available in support of administrative use of microcomputers in the Virginia Beach school system. Few facilitators are currently available to Virginia Beach

TABLE 8

FACILITATORS CURRENTLY AVAILABLE THAT SUPPORT ADMINISTRATIVE USE OF MICROCOMPUTERS--PERCENTAGES

Current Facilitators	Responses			
	Available		Not Available	
	%	n	%	n
1. Access to a microcomputer in school office	32	23	68	49
2. Recognition possibilities for computer use	32	23	68	49
3. Administrative computer training which allows for individual user differences	28	20	72	51
4. Release time	18	13	82	58
5. Promotion opportunities	7	5	93	67
6. Financial rewards	7	5	93	67
7. Access to a microcomputer on school administrator's desk	6	4	94	68
8. Access to a microcomputer to take home	6	4	94	68

elementary school administrators. The three facilitators cited as currently available by approximately 30% of school administrators are as follows: Access to a microcomputer in school office (32%), Recognition possibilities for computer use (32%), and Administrative computer training which allows for individual user differences (28%). Release time was cited by 18% of the respondents. Financial rewards and Promotion opportunities were listed by only 7% of school administrators. Other facilitators concerning accessibility to microcomputers such as Access to a microcomputer on school administrator's desk and Access to a microcomputer to take home, were listed as available by only 6% of the Virginia Beach school administrators.

In the related literature, a number of structural barriers that can impede the large-scale use of technology in schools has been identified. Pogrow specifically cites the problems of access to microcomputers and lack of incentives to support administrative use of microcomputers.[11]

The Virginia Beach elementary school administrators were also asked in consecutive survey question to indicate their support of these same facilitators. By using the same facilitators in both questions, a "what is" and "what is needed" comparison to the issue of facilitators in support of administrative use of microcomputers can be assessed.

Table 9 lists the desired facilitators in order of importance as indicated by Virginia Beach elementary school

TABLE 9

DESIRED FACILITATORS THAT WOULD SUPPORT ADMINISTRATIVE USE OF MICROCOMPUTER--PERCENTAGES

Desired Facilitators	Responses					
	Principals		Assistant Principals		Total Percent Responding	
	%	n	%	n	%	n
1. Administrative computer training which allows for individual user differences						
Agree	94	32	100	39	97	71
Disagree	6	2	0	0	3	2
TOTAL	100	34	100	39	100	73
2. Access to a microcomputer in school office						
Agree	94	31	97	38	96	69
Disagree	6	2	3	1	4	3
TOTAL	100	33	100	39	100	72
3. Access to a microcomputer on school administrator's desk						
Agree	78	25	90	35	85	60
Disagree	22	7	10	4	15	11
TOTAL	100	32	100	39	100	71
4. Recognition possibilities for computer use						
Agree	73	24	87	34	80	58
Disagree	27	9	13	5	20	14
TOTAL	100	33	100	39	100	72
5. Release time						
Agree	67	22	87	34	78	56
Disagree	33	11	13	5	22	16
TOTAL	100	33	100	39	100	72

TABLE 9--Continued

Desired Facilitators	Responses					
	Principals		Assistant Principals		Total Percent Responding	
	%	n	%	n	%	n
6. Access to a microcomputer to take home						
Agree	66	21	82	32	75	53
Disagree	34	11	18	7	25	18
TOTAL	100	32	100	39	100	71
7. Promotion opportunities						
Agree	61	20	85	33	74	53
Disagree	39	13	15	6	26	19
TOTAL	100	33	100	39	100	72
8. Financial rewards						
Agree	61	20	85	33	74	53
Disagree	39	13	15	6	26	19
TOTAL	100	33	100	39	100	72

administrators. The three most reported facilitators that would support administrative use of microcomputers are as follows: Administrative computer training which allows for individual user differences (97%), Access to a microcomputer in school office (96%), and Access to a microcomputer on school administrator's desk (85%). Recognition possibilities for computer use and Release time were cited as needed by about 80% of school administrators. In addition, Access to a microcomputer to take home was listed by 75% of the respondents. Promotion opportunities and Financial rewards were facilitators indicated by about 74% of Virginia Beach elementary school administrators.

All of the facilitators are listed as important by over 70% of the respondents. However, training and accessibility are issues of most importance to Virginia Beach elementary school administrators expressed in this question and other responses to survey questionnaire items. An accessibility problem was reported in the barrier, Insufficient number of microcomputers in schools, selected by over 70% of school administrators (Table 7) and again in percentages of responses to facilitators relating to access to microcomputers in Tables 8 and 9.

Comparisons can be drawn from Table 8 and Table 9 between what facilitators are currently available and what facilitators are needed to support administrative microcomputer use in schools. For example, in assessing

the facilitators, school officials need to view "what is" the present situation and "what is needed" to support administrative microcomputer use.

Of specific interest to Virginia Beach school officials are the two most desired facilitators needed to support the administrative use of microcomputers in the Virginia Beach schools. Ninety-seven percent of the school administrators responded that administrative computer training which allows for individual user differences was needed for computer use; whereas, only 28% reported this as currently available. Also, 96% of school administrators indicated the need for access to microcomputers in school offices and only 32% indicated that they currently had access to microcomputers in school offices. This data suggest the following to this researcher: (1) training is available to some administrators and they also confirm the need for such training and (2) microcomputers are available to some administrators in school offices and these administrators also confirm their importance in school offices as a facilitator needed to support administrative microcomputer use.

The facilitators identified as needed by Virginia Beach school administrators became change strategies in the administrative microcomputer literacy training paradigm. Change strategies of providing access opportunities to microcomputers in school offices, on school administrators'

desks and to take home, and "hands-on" training opportunities to learn to dispel the perception of computer complexity are incorporated into the training paradigm.

Hypothesis number four: There are no differences in responses by position of principal and assistant principal to the indicated facilitators that would facilitate administrative use of microcomputers.

A difference in responses by principals and assistant principals is reflected in two of the eight listed facilitators. More assistant principals agreed to the facilitators, Promotion opportunities and Financial rewards, than principals agreed to these facilitators.

The data above, reflecting differing responses by position--principal and assistant principal--to facilitators influencing administrative use of microcomputers suggest that school officials must begin to look now and in the future at the desired facilitators indicated by specific school personnel in specific position that may be needed to support innovations in schools.

For example, the issue of increasing microcomputer use in schools may require a thorough assessment of facilitators needed not only by administrative personnel, but other school personnel as well, even including students and parents. Implementation of training and expected outcomes can be enhanced through a thorough assessment of all the participants involved in making the change to

microcomputer use in schools. The total school environment needs to respond to the rise of microcomputers in education. School personnel, students, and parents all must become active, trained participants in the application of computers in schools.

District-level organizational factors survey response data

Research question number five:

> What are the district-level organizational factors that would facilitate and support the use of microcomputers in schools?

In Table 10, the two responses indicated most often as 'very important' to the questionnaire survey item about organizational conditions that would facilitate and support the use of microcomputers in schools are Commitment to continuous staff training in computer literacy (92%) and Support expenditures for microcomputers (84%). Again, the trend expressed by the Virginia Beach school administrators for training and accessibility has been verified.

Combining the response categories of 'very important' and 'somewhat important' is necessary in reporting the remaining data by agreement to the organizational factors needed to support microcomputer use at the district level by Virginia Beach school administrators. Endorsement by high-level school officials, Having district goals for administrators' computer literacy, District computer

TABLE 10

DISTRICT-LEVEL ORGANIZATIONAL FACTORS THAT WOULD FACILITATE AND SUPPORT MICROCOMPUTER USE--PERCENTAGES*

Organizational Factors	Responses					
	Very Important		Somewhat Important		Not Important	
	%	n	%	n	%	n
1. Commitment to continuous staff training in computer literacy	92	68	8	6	0	0
2. Support expenditures for microcomputers	84	62	16	12	0	0
3. Endorsement by high-level school officials	64	47	27	20	9	7
4. Having district goals for administrators' computer literacy	62	46	35	26	3	2
5. School board policy toward computer use	54	40	34	25	12	9
6. District computer coordinator	50	37	43	32	7	5
7. Incentives for school personnel to use microcomputers	47	35	35	26	18	13
8. Bottom-up/ participatory decision-making	38	27	56	40	18	13
9. Coercion	11	8	35	25	54	39

*Note: Percentages may not equal 100% due to rounding of figures.

coordinator, and Bottom-up/participatory decision-making were listed by over 90% of the school administrators. School board policy toward computer use and Incentives for school personnel to use microcomputers were acknowledged as important by 80% of respondents.

Only 46% of school administrators considered Coercion as an important organizational condition needed to support the change to microcomputer use in schools. Coercion suggested by authors Kotter and Schlesmanger[12] as a strategy to deal with resistance to change was investigated as a possible change strategy to microcomputer use. However, the factor Coercion was reported as 'very important' by only 11%, 'somewhat important' by 35% and 'not important' by 54% of Virginia Beach elementary school administrators. Subsequently, coercion was not considered in the design of the training paradigm for Virginia Beach elementary school administrators.

In analyzing the responses of 'very important' to district-level organizational factors that would facilitate and support the use of microcomputers in schools, the data seem to suggest that the priority at this time is for the Virginia Beach school district to provide some preliminary organizational conditions and commitments concerning microcomputer use prior to implementing the organizational conditions needed to support the actual use of computers in the schools. Once a school system has endorsed computer use, made a commitment to staff training for such use, and

established a course of action through budgetary decisions, computer literacy goals, and school board policy, then the district computer coordinator, incentives, and school-level decision making become important.

The data reinforce that to support the microcomputer innovation in schools requires district-level organizational factors, followed by school-level organizational factors, and possibly additional factors identified in response to assessed needs. School system officials need to respond to introducing, implementing, and sustaining training efforts by providing support at all levels and not independently of each other. Thus, the identified organizational factors that are supportive to the change to microcomputer use in schools as indicated by Virginia Beach elementary school administrators are incorporated into the extrinsic goals developed for the administrative microcomputer literacy training paradigm of this study.

School-level organizational factors survey response data

Research question number six:

> What are the school-level organizational factors that would facilitate and support the use of microcomputers in schools?

Table 11 displays the organizational factors by percentages of support by school administrators. There was no difference in responses to organizational factors by

TABLE 11

SCHOOL-LEVEL ORGANIZATIONAL FACTORS THAT WOULD FACILITATE AND SUPPORT MICROCOMPUTER USE--PERCENTAGES*

Organizational Factors	Responses					
	Very Supportive		Supportive		Not Supportive	
	%	n	%	n	%	n
1. Student support	80	59	20	15	0	0
2. Parent support	57	42	42	31	1	1
3. Ranking administrator support	52	38	47	34	1	1
4. Personal interest of school principal	46	34	50	37	4	3
5. Teacher support	41	30	55	41	4	3
6. School computer resource teacher	37	26	39	27	24	17
7. Business/community support	26	19	63	45	11	8
8. Guidelines in obtaining hardware and software for schools	23	17	74	54	3	2
9. Guidelines and procedures for implementing school computer use	23	17	72	53	5	4
10. Availability of space in schools	13	10	69	51	18	13
11. University/college training assistance	13	9	57	40	30	21

*Note: Percentages may not equal 100% due to rounding of figures.

position or level of competence with microcomputers. All the district support may be in place but still under-utilization of microcomputers in schools could be reported. School decentralization and the individualization of the adoption process of innovation require not only providing organizational factors supporting microcomputer use at the district level, but also at the school level as well. Subsequently, the responses to this question provide some direction on what factors are needed to facilitate and support microcomputer use at the school level.

The three factors reported most often by Virginia Beach elementary school administrators as 'very supportive' to the utilization of microcomputers in schools are as follows: Student support (80%), Parent support (57%), and Ranking administrator support (52%). Combining the categories of 'very supportive' and 'supportive' is necessary in reporting the remaining data by agreement to the factors needed to support microcomputer use at the school level by Virginia Beach school administrators.

The factors, Personal interest of school principal, Teacher support, Guidelines in obtaining computer hardware and software for schools, and Guidelines and procedures for implementing school computer use are listed by over 90% of survey respondents. Over 80% of the school administrators indicated Business/community support and Availability of space in schools as factors supporting the utilization of microcomputers in the school environment. School computer

resource teacher and University/college training assistance were reported by about 70% of Virginia Beach school administrators.

To the most supportive factor, Student support, indicated by Virginia Beach elementary school administrators, a follow-up question was posed. Several administrators were asked why student support was so important. Most administrators reported that student support is always necessary when making a change in the school environment. The students must be responsive and responsible in implementing computer use in schools. Student cooperation, patience, and assistance are essential in the move to computing in schools.

Many administrators suggested that students need to be trained in the use of microcomputers before they use them and they must understand this. All of the elementary school administrators mentioned the pressure from students and parents for computer use in schools while school personnel remain virtually untrained and unprepared for leadership in computer use. One administrator's response is of importance to the issue of utilization of micro-computers in the schools: "Let's work and support each other and not alienate each other in our efforts."[13]

The factor, Teacher support, was not ranked as high as student, parent, and ranking administrator support. This may be due to the fact that there still exist only a few teachers in each school that are trained. Also, teachers

have not been trained on how to effect change within the school environment.

Guidelines in obtaining hardware and software for schools and Guidelines and procedures for implementing school computer use are school-level organizational factors considered important by over 90% of the school administrators. During the needs assessment process, one of the Virginia Beach school administrators interviewed admitted that many district guidelines and procedures remain unused by school building administrators and that is why they must also exist at the school level.

Even though the factor School computer resource teacher was considered 'supportive' by 76% of Virginia Beach elementary school administrators, out of the 24% of the school administrators who indicated 'not supportive,' 17% of them were assistant principals while only 7% were principals. This may be an indication of conflict in leadership roles and responsibilities for computer use in schools. The school computer resource teacher may pose a threat to the assistant principal's position in regard to power, prestige, and to being the person that provides knowledge, assistance, and leadership to teachers and students in the school environment. The assistant principals may want to be responsible for implementing computer use in schools.

Of interest to this and future studies is the response of 'not supportive' by 30% of the elementary school

administrators to University/college training assistance. Out of this 30%, 9% were principals and 21% were assistant principals. Possibly colleges in the area are not offering training assistance that is perceived by Virginia Beach school administrators, specifically assistant principals, as responding to their needs.

The related literature repeatedly suggests that a commitment to computers in schools is needed from groups such as board members, parents, administrators, teachers, students, industry, and educational organizations. The school administrators in this study support the need for such internal and external support for school system technology innovation. Knowledge of such organizational factors is needed to develop the extrinsic goals of the training paradigm and for insight into planning for implementation of training and outcomes from this administrative microcomputer literacy training model.

Training preferences survey response data

Research question number seven:

> What are the training preferences of Virginia Beach elementary school administrators?

Most of the principals and assistant principals reported that they would prefer training offered during Inservice days (82%), by Educational computer experts (88%), and in a Workshop training format (92%). The next

most preferred training responses were for training to be offered during School hours, by Consultants or In-house trainers, and in an On-the-job training format. In contrast, school administrators do not like training offered After school, by Computer vendor trainers, and in a Course/option format.

The agreement of training preferences by elementary school principals and assistant principals allows the training paradigm to initially be set up in accordance with the expressed preferences. The training preferences are also used to develop change strategies for the training paradigm. The administrative microcomputer literacy training paradigm developed for the elementary school administrators of Virginia Beach is designed entirely from responses from this population. Training planned in response to assessed needs increases the potential for implementation of training and outcomes.

Learning style preferences survey response data

Research question number eight:

What is the preferred learning style of Virginia Beach elementary school administrators?

The Virginia Beach elementary school administrators overwhelmingly prefer Hands-on training (87%) and Small-group instruction (80%). Some authors have pointed out that learning style is least considered in planning training.

The result is that many people are discriminated against when it comes to training. The editors of the magazine Training suspect that this is true and recommend that learning style be identified along with factors such as attitudes.[14] The learning style was included as a questionnaire item to further enhance the training design.

Identifying the learning style desired by most of the Virginia Beach elementary school administrators increases the receptiveness to training and the rate of adoption of innovation. Subsequently, the above preferred learning style was the recommended method of computer instruction and a change strategy of the administrative microcomputer literacy training paradigm.

These study findings not only have management policy implications but also have implications for future research in designing effective microcomputer literacy training models. The recommended administrative microcomputer literacy training paradigm designed for elementary school administrators of Virginia Beach, Virginia, based on the above research findings, is presented in Chapter V.

ENDNOTES

[1]"How to Conquer Fear of Computers," Business Week, March 29, 1982, p. 176.

[2]Neill, p. 6.

[3]Leventhal, p. 79.

[4]Lichtman, pp. 48-50.

[5]Wright and Stone, pp. 1-148.

[6]Crawford, p. 1.

[7]Brown, p. 20.

[8]See Stanley Pogrow, Education in the Computer Age (Beverly Hills, Calif.: Sage Publications, 1983), pp. 87-88; David Moursund, "Microcomputers Will Not Solve the Computers-in-Education Problem," ed. J. L. Thomas (Phoenix, Ariz.: Oryx Press, 1981), pp. 112-116.

[9]See Kenneth Jones and Thomas Dukes, "Microcomputers in School Administrative Management," Educational Technology 23 (March 1983):38-39.

[10]Stephen Radin and Harold M. Greenberg, Computer Literacy for School Administrators and Supervisors (Lexington, Mass.: D. C. Heath, 1983), p. 163.

[11]Pogrow, Education in the Computer Age, p. 88.

[12]Kotter and Schlesinger, pp. 106-114.

[13]Interview with several Virginia Beach elementary school administrators, Virginia Beach, Virginia, 15 May 1985.

[14]Zemke, p. 31.

CHAPTER V

ADMINISTRATIVE MICROCOMPUTER LITERACY TRAINING MODEL, SUMMARY AND CONCLUSIONS

The study findings are discussed, summarized, and placed within the framework of the following sections of this chapter: (1) Planning for Support of School System Technology Innovation; (2) Administrative Microcomputer Literacy Training Paradigm: Goals, Training Format, Change Strategies; and (3) Conclusions and Future Implications.

Planning for Support of School System Technology Innovation

Planning for support of school system technology innovation requires a discussion of individual, organizational, and environmental factors. These factors are receiving increased attention by authors Naisbitt, Brown, Pogrow, and Neill[1] in planning comprehensive computer literacy training efforts and in providing internal and external support for technology programs in schools. The findings of this study are included in this section in order to highlight and support the need for comprehensive planning for the microcomputer innovation in schools.

Individual Factors

According to a landmark study conducted by Booz, Allen, and Hamilton, Inc.,[2] individual factors of age and tenure were reported as having an effect on a person's receptiveness to computers. Despite the reported differences in Virginia Beach elementary school administrators' ages and years in position, these differences did not affect their attitudes toward computer use. One reason may be because the factors of age and years in position are no longer seen as explanations for delay, inactivity, and/or personal resistance to computers. Computers are now a part of our society and our schools.

The Virginia Beach school administrators reported an overwhelming positive attitude toward the administrative use of microcomputers. The negative attitude was reported by only 1% of school administrators; however, a mixed attitude was reported by about 30% of school administrators. As reported by Winkle, Mathews, and Billings,[3] many educators have negative and mixed feelings concerning computer technology for education. A negative attitude was not apparent in this population whereas a mixed attitude toward computers was.

School administrators with mixed attitudes toward computer use in this study reported feelings of fear, tenseness, and confusion. The computer was seen as complex and a passing fad. Consequently, training must focus on

this mixed attitude and the accompanying feelings in order to change this attitude found within the educational community to a positive attitude toward microcomputers. According to Conners, introducing technology into an organization will require some individuals to modify something about their attitudes and perceptions. He insists that to manage change, these emotional factors must be treated with appropriate training.[4]

Maccoby asserts that certain social conditions have to be met for the new technology to be effective. One social condition that is most appropriate to the computer training effort is the attitudes of the individuals who will use the technology. If the proper attitude is missing, the technology will not be used.[5] Pogrow continues this thought by stating that the key limiting factor to the use of microcomputers is school personnel's ability to willingness to work with the new technology.[6]

Varying amounts of computer training were reported in the population of this study and this trend will undoubtedly continue. The amounts of computer training reported by Virginia Beach school administrators were collapsed into two levels: Beginner and Experienced. Thus, the "Beginner" category represents from 0 to 12 hours of computer training and the "Experienced" category from 13 to 18 or more hours of training. Only 8% of the school administrators reported no computer training.

The "Beginner" level was reported by 60% of the school administrators. Consequently, training must respond to the needs of this specific group of users. The feelings indicated significantly more by the "Beginners" than the "Experienced" group were Confusion, Unpreparedness, and that the computer was Too Complicated. This group also reported they were Not Motivated when thinking about microcomputers. According to a report by a Texas legislative committee on technology use in education, administrators can reduce and eliminate fears surrounding computer use by learning more about microcomputers and having "hands-on" experience with them.[7] Deck also reported there was a high degree of acceptance of computer potential provided school personnel learn how to use the computer.[8]

Interestingly, the same training needs were reported by school administrators whether they were beginners or more experienced computer users. According to this study's population, prior computer training was not related to the training needs of school administrators. Bramble, Mason, and Berg report that a discrepancy exists between the available technology and the training necessary to enable educators to use it.[9]

The literature repeatedly suggests that training must respond to the specific needs of specific populations within school systems. Training must specifically focus on aspects of the microcomputer revolution that concern

school administrators. Each potential computer user must see a need being satisfied. As the users assess the personal benefit of the innovation, they assume a degree of "ownership" for the innovation.

Authors Neill and Goodson[10] suggest that school administrators must initially become daily users of the microcomputer in order to fully understand the power and potential of this new technology for improving educational programs, administrative management, and educational services. This direct interaction with the computer can result in a sense of comfort and good judgment about the positive effects technology can offer education.

Organizational Factors

The organizational factors indicated by this study's population as needed to facilitate and support the use of microcomputers in schools include having a commitment to microcomputer training and funding. The Houston Independent School District, Texas, established a technology department which represents the most comprehensive district-wide fiscal and organizational commitment to educational technology in the country.[11]

In this school district for the past three years, funding has been a matter of setting program priorities. Augustina Reyes, chairman of the Houston school board, said that the board has "skimmed off" about $28 million in programs and redirected that money to support more

essential programs.[12] For example, the drivers education program was eliminated and the funds redirected to the technology program. This reprioritizing of programs and redirecting of funds serves as an example of what urban school districts can do to support microcomputer use in schools.

Additional district-level organizational factors reported as needed to support microcomputer use are school board policies concerning microcomputer use, goals for administrators' computer literacy, guidelines in obtaining hardware and software for schools, and guidelines and procedures for implementing microcomputer use in schools. The provision of goals for administrators' computer literacy has increased relevancy to this study's population as it serves as an endorsement to the administrative use of computers in schools. In addition, survey data revealed a discrepancy in school administrators' knowledge of such district goals. Subsequently, availability of computer literacy goals and communicating such goals could facilitate and support microcomputer use in schools.

A school district reward system or plan for microcomputer use was also acknowledged by the majority of the Virginia Beach school administrators. Specific incentives perceived to have the greatest influence on administrative use of microcomputers by this study's

population were to provide continuous staff training and access to microcomputers in school offices, on school administrators' desks, and for school administrators to take home.

Judy Allen, a professor of education at Portland, Oregon State University, offers this guideline: "There is a direct relationship between comfort with the computer and the number of hours spent in becoming computer literate."[13] Further, Goodson suggests that principals' interest, knowledge, and support of computer use in schools comes from their use in the offices.[14] In this study, more hours of computer training resulted in a significantly higher perceived level of competence with computers. In addition, more school administrators owning a microcomputer reported a higher level of competence with microcomputers. Statements like these coupled with the findings from this study support the conclusion that microcomputer training and accessibility can result in computer proficiency as well as increased personal confidence with this new technology. Subsequently, many opportunities for access to microcomputers would facilitate and support their use in schools.

The need for recognition possibilities and release time was also mentioned by Virginia Beach elementary school administrators as facilitators that would support administrative microcomputer use. Authors Pogrow and Johnson discuss the lack of rewards or incentives for

computer use in schools. Johnson specifically reports that technology is little understood by most existing school personnel who are functioning under time pressures and have been given little incentive to retool.[15] Talley advises that training and time away from regular duties for school personnel are necessary in implementing new technology in schools.[16] Organizational factors such as those identified above must be included in the design of computer training programs in order to effect and sustain the change to microcomputer use in schools.

Environmental Factors

All the organizational district support may be in place but still underutilization of microcomputers in schools exists. School decentralization and the individualization of the adoption process of innovation require not only providing organizational factors supporting microcomputer use at the district level, but at the school level as well. Subsequently, the Virginia Beach school administrators' responses discussed below may provide some guidelines as to additional factors needed to facilitate and support microcomputer use in schools.

The support from students, parents, and ranking administrators was reported by this study's population of school administrators as needed to facilitate microcomputer use in schools. The majority of the school administrators also

indicated the importance of business and community support. The literature repeatedly suggests that a commitment to computers in schools is needed from the business and industry communities, civic groups, and other school and community organizations. School officials need skills in developing and sustaining productive collaborations and partnership arrangements with groups outside of the educational community to maximize financial and resource assistance for the microcomputer innovation in schools.

Generating commitment to computer use in schools from groups--namely, board members, parents, school officials, school administrators, teachers, students, business and industry personnel, and community leaders--is necessary in supporting expenditures for microcomputers and use of microcomputers in schools. Neill reports that high expectations exist among parents, industry, government, and education concerning technology and the need for it to be actively integrated into schools.[17]

Several ways to involve parents and the community in the use of computer technology include keeping them informed about the use of computers in schools; involving them as members of district and school committees, advisory boards, or task forces concerning computer use; and seeking them as volunteers to work with the computer education program. Such a network of people and "linkage of roles"[18] can provide by their interest, involvement, and

resources both internal and external support for school system technology innovation.

Administrative Microcomputer Literacy Training Paradigm: Goals, Training Format, Change Strategies

The recommended administrative microcomputer literacy training paradigm developed for elementary school administrators of Virginia Beach represents a synthesis of this study's findings. The two most reported needs indicated by Virginia Beach school administrators were the need for computer literacy and the need for administrative microcomputer literacy training. Both can be met by implementing the recommended training paradigm.

The specific tasks in the design of the administrative computer literacy training paradigm are as follows: (1) to establish cognitive, proficiency, intrinsic, and extrinsic goals; (2) to devise a training format; and (3) to develop change strategies that would facilitate and support the use of microcomputers in schools.

Goals

The goals presented in Figure 1 as part of the administrative microcomputer literacy training paradigm are listed as cognitive, proficiency, intrinsic, and extrinsic goals. Review of computer literacy training programs revealed cognitive goals and/or proficiency goals within computer literacy training efforts. However, this researcher found by reviewing planning models and guidelines

Figure 1

GOALS of ADMINISTRATIVE MICROCOMPUTER LITERACY TRAINING PARADIGM

COGNITIVE GOALS

1. Knowledge of instructional uses of microcomputers
2. Knowledge of administrative uses of microcomputers
3. Knowledge of computer capabilities and constraints in education and school administration
4. Knowledge of the peripheral devices such as printers, storage devices, and modems, etc.
5. Knowledge of how to evaluate administrative software

PROFICIENCY GOALS

6. Ability to implement computer use in schools
7. Ability to use a variety of software programs in personal, academic, and professional contexts
8. Ability to identify computer training needs in schools
9. Ability to program data according to informational needs

INTRINSIC GOALS

1. Increased feelings of being innovative through computer experience
2. Increased feelings of being efficient through computer experience
3. Increased feelings of being successful through computer experience
4. Increased feelings of computer competence through computer experience.

EXTRINSIC GOALS

1. Commitment to continuous staff training in computer literacy
2. Support expenditures for microcomputers
3. School district endorsement
4. School district administrator computer literacy goals
5. Guidelines in obtaining hardware and software for schools
6. Guidelines and procedures for implementing microcomputer use in schools

for educational computer use that neither intrinsic nor extrinsic goals had been reported or applied to computer literacy training.

Thus, the inclusion of intrinsic and extrinsic goals in this training paradigm adds new knowledge to computer literacy efforts of school systems. Specifically, the intrinsic goals are designed to be "motivators" and to foster the sense of "ownership" needed by the elementary school administrators to put this new technology to work in schools. The extrinsic goals are designed to respond to identified organizational factors that would facilitate and support the use of microcomputers in schools. Both the intrinsic and extrinsic goals enhance implementation of training within the school environment. Only in this way can training be designed to increase knowledge and skills in computer use and to effect and sustain the change to microcomputer use in schools.

The cognitive and proficiency goals established for the administrative microcomputer literacy training paradigm were developed from prioritized administrative microcomputer training needs responses. The intrinsic goals were established from school administrators' responses to attitudinal words selected to describe their feelings toward the word "microcomputer." The responses cited most often to attitudinal words concerning microcomputer use are Receptive, Useful, Innovative, and Challenged. The

school administrators' responses listed above provided the basis for establishing the specific intrinsic goals of Increased feelings of being innovative through computer experience and Increased feelings of being efficient through computer experience.

Further analysis of the school administrators' responses to attitudinal words by indicated level of competence with microcomputers and attitude toward the use of microcomputers revealed significant findings that were used in establishing additional intrinsic goals. Training must specifically respond to the needs of 60% of the Virginia Beach elementary school administrators that reported the "Beginner" level of competence with microcomputers. Significantly more of the school administrators indicating the "Beginner" level of competence reported that they were Not Motivated toward microcomputer use and felt Unprepared and Confused. The microcomputer was also seen as Too Complicated. The intrinsic goals of Increased feelings of being successful through computer experience and Increased feelings of computer competence through computer experience respond to the above needs.

The intrinsic goals are also designed to meet the needs of the respondents who have indicated a "Mixed" attitude toward computers (29%). Significantly more school administrators with the "Mixed" attitude toward administrative microcomputer use indicated they felt Tense,

Fearful, and Confused when thinking about microcomputer use. Also, they felt the microcomputer was Too Complicated and a Fad. Thus, staff development planners must consider that increasing the feelings of being successful and competent in using the microcomputer are necessary in order to effect the change to microcomputer use in schools.

The extrinsic goals were primarily established from the survey questionnaire responses pertaining to district-level and school-level organizational factors that would facilitate and support the use of microcomputers in schools. The two responses indicated most often as 'very important' to the organizational factors needed to support administrative use of microcomputers and used as extrinsic goals are Commitment to continuous staff training in computer literacy and Support expenditures for microcomputers. Combining the response categories of 'very important' and and 'somewhat important' to this survey questionnaire item was necessary in establishing additional extrinsic goals for the training paradigm. The extrinsic goals, School district endorsement and the availability of School district administrator computer literacy goals, were reported by over 90% of the school administrators as organizational factors needed to support administrative microcomputer use.

The extrinsic goal, School district administrator computer literacy goals, has increased value to the success of this training effort since earlier survey data revealed

a discrepancy in school administrators' knowledge of such district goals. Only 28% of Virginia Beach elementary school administrators reported that there were district goals for school administrators' computer literacy. Forty-one percent reported there were no goals, while the remaining 31% of the school administrators indicated that they did not know. Consequently, school officials must establish and communicate district administrators' computer literacy goals in order to facilitate and support the administrative use of microcomputers.

The school-level organizational factors needed by the majority of Virginia Beach school administrators and established as extrinsic goals are Guidelines in obtaining hardware and software for schools and Guidelines and procedures for implementing microcomputer use in schools.

The cognitive and proficiency goals also provide the training topics in the module design of the administrative microcomputer literacy training path described below. The intrinsic and extrinsic goals foster computer technology transfer possibilities and implementation of training and outcomes. All of the goals respond directly to the identified microcomputer literacy training needs of Virginia Beach elementary school administrators.

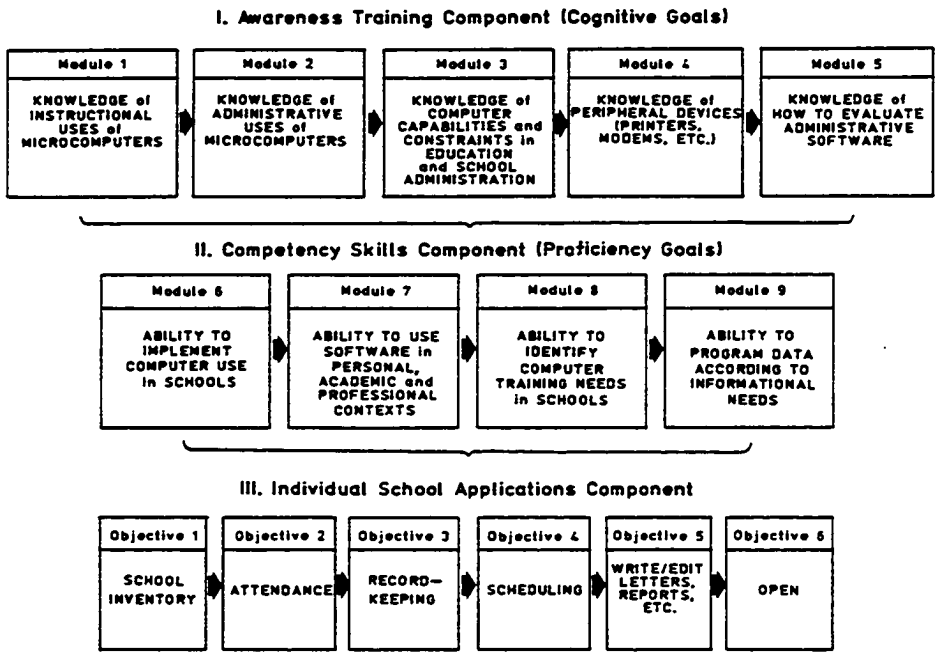
Training Format

The administrative microcomputer literacy training format displayed in Figure 2 constitutes the training path designed and structured to meet the identified training needs of Virginia Beach elementary school administrators. There were no reported differences between hours of computer training or indicated level of competence with microcomputers by principals and assistant principals and the beginner and experienced level of computer users indicated the same training needs. Subsequently, the training format is designed as a single administrative training path and initially without training levels. However, if levels are needed within the training effort, additional modules can be designed to respond to these identified needs. Study findings summarized and presented below support the design of the training path.

The administrative training needs were grouped into knowledge and skill areas of computer use. The cognitive goals identified earlier were established from the identified knowledge training needs and became modules of instruction 1-5 constituting in effect an "Awareness" component of this training path. The modules are entitled: Knowledge of Instructional Uses of Microcomputers, Knowledge of Administrative Uses of Microcomputers, Knowledge of Computer Capabilities and Constraints in Education and School Administration, Knowledge of

Figure 2

ADMINISTRATIVE MICROCOMPUTER LITERACY TRAINING PATH



Peripheral Devices (Printers, Modems, Etc.), and Knowledge of How to Evaluate Administrative Software.

The proficiency goals established from the identified skills training needs were grouped under modules 6-9 of the "Competency Skills" component of training. They include the following: Ability to Implement Computer Use in Schools; Ability to Use Software in Personal, Academic, and Professional Contexts; Ability to Identify Computer Training Needs in Schools, and Ability to Program Data According to Informational Needs.

To achieve the proficiency goals, a final component of training, "Individual School Applications" was included in the training path design as objectives 1-5. The objectives 1-5 directly relate to the specific computer applications identified by Virginia Beach elementary school administrators as "Most Useful" in the management of elementary schools. They are as follows: School Inventory; Attendance; Recordkeeping; Scheduling; and Write/Edit Letters, Reports, Etc.

This final component is important for reasons cited earlier in this chapter such as the principals' interest, knowledge, and support of computers in schools comes from their use of computers in school offices and each potential computer user must see a need being satisfied. As school administrators assess the personal benefit of the innovation, they assume a degree of "ownership" for the innovation.

Additional objectives and modules can be designed for follow-up assistance and special interests. Thus, the training path can continue to provide administrative computer training which allows for individual user differences and staff training opportunities for Virginia Beach elementary school administrators.

Change Strategies

The change strategies developed for the administrative microcomputer literacy training paradigm resulted from analyzing responses to barriers, facilitators, training delivery, and learning style preferences pertaining to administrative use of microcomputers. The study findings revealed the need for more accessibility to microcomputers, incentives for computer use, and time to learn how to use microcomputers. The change strategies are designed to respond to these identified needs and ultimately to facilitate and support the use of microcomputers in schools. The change strategies are listed and described below:

1. Make the microcomputer accessible in school offices, on school administrators' desks, and available for school administrators to take home
2. Provide incentives for microcomputer use in schools through recognition possibilities, release time, promotion opportunities, and financial rewards
3. Provide training on inservice days, by educational computer experts, and in a workshop format

4. Provide "hands-on" training and small-group instruction

5. Provide on-the-job training activities

Providing opportunities for access to microcomputers specifically responds to the identified barriers concerning computer complexity and lack of time to learn how to use microcomputers reported by the majority of Virginia Beach elementary school administrators. In addition, the identified facilitators needed to support administrative use of microcomputers indicated by over 75% of Virginia Beach school administrators are (1) Access to a microcomputer in school office, (2) Access to a microcomputer on school administrator's desk, and (3) Access to a microcomputer to take home. The above data suggest that accessibility and use may overcome the feelings of computer complexity and the time needed to learn how to use the machines.

Study findings revealed that more school administrators who owned a microcomputer indicated the "Experienced" level of competence and more administrators that did not own a microcomputer reported the "Beginner" level of competence with microcomputers. These data support the conclusion that computer accessibility results in a higher perceived level of competence. Consequently, computer access and use could result in computer proficiency and a personal confidence with microcomputers. In addition, more school administrators reporting the

"Beginner" level of competence with microcomputers indicated they were Unprepared, Confused, and that the computer was Too Complicated. Thus, providing many opportunities for access to microcomputers can result in dispelling these feelings.

Additional analysis of responses to attitudinal words and analysis of responses to owning a microcomputer and responses to attitudinal words pertaining to complexity of microcomputers also support providing many opportunities for access to microcomputers. For example, no school administrators who owned a microcomputer reported the word Too Complicated and fewer administrators who owned a microcomputer indicated the word Unprepared than did the administrators not owning a microcomputer. Thus, training designed with many opportunities for access to microcomputers, then, becomes a change strategy that could facilitate and support the use of microcomputers in schools.

The change strategy to provide incentives for computer use is important. The specific incentives identified as needed by the majority of Virginia Beach school administrators are recognition possibilities for computer use in schools and release time. The recognition possibilities reported during the needs assessment process were to acknowledge individual schools' computer efforts and school administrators' efforts in local newspapers, in-house publications, and staff meetings. Rewards such

as plaques, certificates, and prizes could be provided. Release time was seen in the form of inservice activities, professional days, attendance at conferences, and field trips.

Data collected on specific facilitators needed by specific school personnel in specific positions also can facilitate and support the change to microcomputer use in schools. The Virginia Beach elementary assistant principals specifically reported their need for incentives relating to promotion opportunities and financial rewards.

The administrative microcomputer literacy training paradigm must also take into account the training delivery and learning style preferences of the Virginia Beach elementary school administrators. The majority of the elementary school administrators reported that they would prefer training offered during inservice days, by educational computer experts, and in a workshop training format. Training planned in response to assessed needs and preferences increases the potential for implementation of training and outcomes.

The preferred learning style indicated by Virginia Beach elementary school administrators is "hands-on" training and small-group instruction. Identifying the preferred learning style of school administrators increases the receptiveness to training and rate of adoption of innovation. Thus, change strategies were developed

to respond to these identified training delivery and learning style preferences.

The last change strategy of providing on-the-job training activities was reported as important by over 90% of Virginia Beach elementary school administrators. Providing on-the-job training activities can increase the relevance and applicability of the training effort. Training must be relevant to the needs of the school administrators and school administrators must see a need being satisfied.

The change strategies are a vital part of the administrative microcomputer literacy training paradigm designed for Virginia Beach elementary school administrators as they facilitate and support the change to microcomputer use in schools. Thus, the administrative microcomputer literacy training paradigm designed for Virginia Beach elementary school administrators can increase their knowledge and skills in computer use and can effect and sustain the change to microcomputer use in Virginia Beach elementary schools.

Conclusions and Future Implications

The administrative microcomputer literacy training model for elementary school administrators of Virginia Beach, Virginia, is a computer training model for administrators designed from responses of potential computer users. The design of this study's administrative

microcomputer literacy training model can provide some generic guiding principles for increasing microcomputer use in schools. In addition, the model provides a systematic approach to designing administrative microcomputer literacy training that can be generalized to other school systems across the country.

The ability of school administrators to raise their productivity and to increase the computing capabilities of their schools is critical in the Information Age, as discussed by authors Pogrow, Naisbitt, and Heuston.[19] The model developed for this study not only provides new information for the preparation of school administrators but sheds new light on the field of educational administration in planning for innovation, designing training, planning for implementation of training, and outcomes.

The training provided in this model is designed to increase school administrators' knowledge and skills in microcomputer use and to effect and sustain the change to microcomputer use in schools. Thus, support for change is seen in the context of training. Too often training is seen as a change agent merely by providing needed knowledge and skills. For innovation to succeed and change to occur, training efforts must become more comprehensive in scope and content.

Authors Brown, Crawford, and Protheroe[20] have recently addressed the administrative use of microcomputers in

schools. They reported computer illiteracy as a major barrier to administrative computing. In this study, over 90% of the Virginia Beach school administrators reported computer illiteracy as a barrier to administrative use of microcomputers. This researcher concludes that little progress has been made in training school administrators for the microcomputer innovation in schools.

Over 95% of the school administrators identified administrative computer training as a facilitator that would influence the administrative use of microcomputer in schools. Inadequate assessment of the computer literacy problem and lack of administrative computer literacy training and/or conceptualization of training has stalled the integration of microcomputers in schools. Based on this study's process product training model, the researcher is confident that the "post-Sputnik language lab" demise can be avoided.

The role of microcomputers in our society has expanded dramatically in recent years. As our society moves toward high technology, so must our schools. The need for a well-conceptualized model for computer literacy training becomes more important for both short-term planning and long-range planning in meeting the computer needs of schools and school personnel. This writer recommends that the administrative microcomputer literacy training paradigm designed for elementary school administrators be piloted in the Virginia Beach school

system. It is highly plausible that the administrative microcomputer literacy training model for Virginia Beach elementary school administrators provides the training that enables and empowers school administrators to serve as leaders in the microcomputer innovation in Virginia Beach elementary schools. Ultimately, this model will have increased value to other school systems across the country in their computer literacy training efforts.

Also of interest to this study was the overwhelmingly positive attitude among Virginia Beach school administrators toward administrative use of microcomputers. As reported in the related literature, many educators have negative and mixed feelings concerning computer use. However, the negative attitude was not verified in this study's population, but the mixed attitude was reported by about 30% of the school administrators. From this data, the researcher concludes that current and future computer literacy studies in education will reveal similar findings pertaining to educators' receptiveness to computers. Administrators are aware of their need for computer literacy and are requesting training.

Data from this study suggest that school officials must provide specific incentives for computer use indicated as needed by school personnel in specific leadership positions in schools. Until school officials recognize the need for designing computer literacy training to respond to

the specific needs of specific school personnel in specific positions, the new technology will have little if any impact on educational programs, administrative management, and educational services of schools. For example, analysis of school administrators' responses by specific position of principal and assistant principal revealed a difference in responses to two of the eight listed facilitators. Assistant principals reported the facilitators, Promotion opportunities and Financial rewards, more than principals did.

A thorough assessment of facilitators needed not only by administrative personnel, but by all members of the school community is required to facilitate and support the use of microcomputers in schools. The total school community--from school superintendent to board members, parents, administrators, teachers, students, and community members--needs to respond to the use of microcomputers in education. Appropriate incentives for computer use must be identified and provided for training to be effective and successful.

Further research is suggested in reference to the differing levels of computer competence that may be appearing within school administrative staffs. Two levels of computer competence, "Beginners" and "Experienced," were reported in this study's population. The majority of the Virginia Beach elementary school administrators

indicating the "Beginner" level of competence with microcomputers reported having from 0 to 12 hours of computer training. The "Experienced" level of computer user indicated having from 13 to over 18 hours of training. When analyzing the "Beginner" and "Experienced" level of users in terms of degree of differences in knowledge or skills, it was found that there were no differences in responses to the identified training needs.

This information could mean prior computer training was useless, computer training programs and assistance were inadequate, or computer training did not meet the needs of these school administrators. Future research into differing levels of competence with microcomputers may support this computer training model, which is designed entirely from responses by potential users. Thus, if the training needs of potential computer users were different because of the levels of computer competence, training can be designed to respond to the identified training needs by providing levels of instruction.

An implication derived from this study is that computer use in schools must become a training-technology partnership which involves a leadership issue. Who can best manage the challenge of implementing computer use in schools? This researcher believes that leadership must come from school principals and/or assistant

principals. Direct leadership responsibilities assigned to an individual in an administrative position in schools is required in order to integrate this new technology into schools.

Based on the findings of this study, the assistant principal's role should incorporate implementation of microcomputer use in schools. The assistant principals' interest in computer use was apparent in this study's population. Their motivation surrounding the use of microcomputers was significantly greater than the motivation expressed by principals. Further, assistant principals are frequently younger administrators and many continue to move to other administrative positions. This group could easily be the catalyst to the assimilation and dissemination of microcomputers throughout the entire educational enterprise.

Future studies and school policies should be directed to the role of assistant principal as a key leadership position in the implementation of microcomputer use in schools. Further research into that role and the theory supporting this administrative position in schools is recommended. One of the expected outcomes of this study's training model is to provide leadership for the microcomputer innovation in schools.

Recent books and articles by Naisbitt and McCune[21] suggest that since our society is moving toward high

technology, so must our schools. Computers are becoming increasingly available in our schools for use by students, teachers, and school administrators. Computers have the potential to improve educational programs, administrative management, and educational services of our schools. However, this potential will not be realized until appropriate training and support for change are provided.

ENDNOTES

[1]See Daniel J. Brown, "The Change to Administrative Computing in Schools," AEDS Journal 18 (Fall 1984):17-30; Stanley Pogrow, Education in the Computer Age (Beverly Hills, Calif.: Sage Publications, 1983), pp. 29, 92; Shirley Boes Neill, High Tech for Schools: Problems and Solutions (Arlington, Va.: American Association of School Administrators, 1984), pp. 5, 30, 74-78; John Naisbitt, Megatrends (New York: Warner Books, 1982), p. 40.

[2]"How to Conquer Fear of Computers," Business Week, March 29, 1982, p. 176.

[3]See Winkle and Mathews, "Computer Equity Comes of Age," Phi Delta Kappan (January 1982):314; Karen Billings, "Microcomputers in Education: Now and in the Future," in Microcomputers in the Schools, ed. J. L. Thomas (Phoenix, Ariz.: Oryx Press, 1981), p. 87.

[4]Leventhal, p. 79.

[5]Fairfiels, p. 91.

[6]Pogrow, Education in the Computer Age, p. 88.

[7]Neill, p. 60.

[8]Linton Deck, "A Time for Action: American Schools and the Adaptation of Computer Technology, Part II," Educational Technology 4 (January 1984):25.

[9]William J. Bramble and Emanuel J. Mason with Paul Berg, Computers in Education (New York: McGraw-Hill, 1985), p. ix.

[10]See Shirley Boes Neill, High Tech for Schools: Problems and Solutions (Arlington, Va.: American Association of School Administrators, 1984), pp. 50-62.

[11]Linda Chion-Kenney, "Computer, School, Family in Houston: A Total Commitment," Education Week 4 (November 7, 1984):1.

[12]Ibid., p. 12.

[13]Neill, p. 79.

[14]Ibid., p. 62.

[15]Johnson, p. 19.

[16]Neill, p. 79.

[17]Ibid., p. 10.

[18]Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge (Ann Arbor, Mich.: Center for Research on Utilization of Scientific Knowledge, Institute of Social Research, 1973), pp. 1-12, 3-33, 11-21.

[19]See Stanley Pogrow, Education in the Computer Age (Beverly Hills, Calif.: Sage Publications, 1983), pp. 50-51, 92; John Naisbitt, Megatrends (New York: Warner Books, 1982), pp. 12, 25, 40; Dustin Heuston, Information Technology in Education, Joint Hearings, Subcommittee on Science, Research, and Technology, Ninety-sixth Congress, April 2-3, 1980, p. 39.

[20]See Daniel J. Brown, "The Change to Administrative Computing in Schools," AEDS Journal 18 (Fall 1984):17; Chase Crawford, Educational Administrator's Survival Guide to Administrative Uses of Microcomputers (Tallahassee, Fla.: Department of Education, 1983), p. 1; Nancy Protheroe, School District Uses of Computer Technology (Arlington, Va.: Educational Research Services, 1982), pp. 6-7.

[21]See John Naisbitt, Megatrends (New York: Warner Books, 1982), p. 40; Shirley McCune, Computers and Effective Schools, paper for Appalachian Educational Lab Conference, May, 1983, quoted in Patricia Zigarmi and Rebecca Brown Corwin, The Journal of Staff Development--Staff Development for Computer Literacy (Oxford, Ohio: National Staff Development Council, November 1983), p. 69.

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APPENDICES

APPENDIX A

ADMINISTRATIVE APPLICATIONS OF THE COMPUTER

Administrative Applications of the Computer

A myriad of administrative computer applications have been, and are constantly being developed both by school systems all over the country and by private enterprises. The list that follows represents a sample of some of the computer applications presently being used by educational administrators.

A. Pupil Applications

1. Pupil Data Base
   a. Demographic data

2. Attendance Reporting
   a. Daily absence lists
   b. Attendance reports with appropriate statistics i.e., daily, weekly, monthly, . . ., quarterly, . . ., yearly
   c. State attendance register with appropriate demographic data and statistics
   d. Attendance/absence pattern analysis
   e. Record of new pupils
   f. Record of dropouts
   g. School building/district membership summaries by age, grade, etc.
   h. School system census
   i. Gummed labels for permanent record cards

3. Grade Reporting
   a. Report cards with present and cumulative attendance
   b. Warning notices
   c. Failure list
   d. Honor roll list
   e. Grade distribution and frequency for class, individual teachers and individual departments
   f. Current and cumulative credits
   g. Rank in class
   h. Quality point average
   i. Transcripts
   j. Gummed labels for permanent record cards

4. Course Scheduling
   a. Flexible and comprehensive scheduling options to meet the needs of the individual school
   b. Some reports generated upon successful completion of scheduling process

      i. Individual student schedules
      ii. Class rosters
      iii. Homeroom rosters
      iv. Study hall rosters
      v. Teacher utilization
      vi. Room utilization

vii. Period utilization
viii. Course master list and tally
ix. Gummed labels for permanent record cards

5. Miscellaneous
   a. Test scoring (teacher made and standardized) and analysis
   b. Pupil registration
   c. Pupil census
   d. Enrollment forecasting
   e. Health and immunization records
   f. Guidance and counseling records
   g. Locker assignments
   h. Bus tickets
   i. Co-curricular activities
   j. Work experience

B. Financial Applications

1. Personnel Accounting
   a. Annual budgeted salary
   b. Payroll register
   c. Check printing
   d. Year-to-date register
   e. Local, state and federal reports
      i. Social security, W-2 forms, unemployment benefits, etc.
   f. Teacher annuities
   g. Personnel reports
   h. Weekly time sheets
   i. Labor distribution reports

2. Encumbrance Accounting
   a. Vendor master list
   b. Budget transaction report
   c. Cash listing
   d. Purchase order transaction listing
   e. Detailed budget report
   f. Cash statement
   g. Invoice listing
   h. Bill list
   i. Check register
   j. Check/warrant printing
   k. Open vendor listing
   l. Vendor master file maintenance report

3. Accounts Receivable

4. Job Cost Accounting

5. School Lunch Income and Expenditure Accounting

6. General Budget Preparation/Accounting

C. Personnel Applications

1. Employee Data Base
   a. Demographic data
2. Position Control
3. Recruitment and Hiring
4. Certification
5. Inservice Training
6. Employee Retirement
7. Substitute Teachers
8. Salary Information
9. Employment record
   a. Absenteeism, leaves-of-absence, sabbaticals, etc.
10. Evaluations

D. Instructional/Non-Instructional Material Applications

1. Instructional Materials Inventory
2. Instructional Materials Booking and Scheduling
3. Library and Textbook Ordering
4. Warehouse Inventory and Requisitioning
5. Purchasing
6. Instructional Materials Catalogues
7. School Lunch Planning, Ordering and Inventory

E. Facilities and Equipment Applications

1. Facilities Inventory
2. Facilities Construction Project Control
3. Work Order Request Scheduling
4. Bus Scheduling and Routing
5. Equipment Inventory
6. Preventive Maintenance Schedule

7. Facilities Utilization and Evaluation

8. Equipment Utilization and Evaluation

9. Future Facilities Planning

F. Community Characteristics

1. Identification Data
   a. Grid, political, geographic, postal, administrative, zoning, sheets, etc.

2. Facilities and Services
   a. Recreational, cultural, law enforcement, fire protection, health/welfare facilities, transportation

3. Socioeconomic Characteristics
   a. Property values, dwelling types, police information, neighborhood characteristics, occupational groups, industry, welfare data, government employment

The above list is by no means complete. The number and types of applications will continue to increase as school administrators gain more sophistication in utilizing systems concepts and computer technology to meet their existing and ever increasing need for management data.

From: Educational Computer Technology: A Manual/Guide for Effective and Efficient Utilization by School Administrators, by Bernard Sidman. Published by R. & E. Research Associates, 936 Industrial Ave., Palo Alto, California 94303 (1979).

APPENDIX B

ADMINISTRATIVE MICROCOMPUTER TRAINING NEEDS ASSESSMENT: OPEN-ENDED INTERVIEW QUESTIONNAIRE

ADMINISTRATIVE MICROCOMPUTER TRAINING NEEDS ASSESSMENT
OPEN-ENDED INTERVIEW. QUESTIONNAIRE

Date _____

Name_____

A. React to administrative microcomputer use for Virginia Beach elementary schools.

1. What can the microcomputer accomplish in elementary school administrative management? In Virginia Beach elementary schools? Administrative management defined as the administrative processes in the management of the schools, i.e., business and public service functions.

2. What is your personal response or disposition toward administrative computing? (attitude toward the administrative use of the microcomputer and experience with microcomputer use)

3. What do you see as the advantages to administrative computing?

4. What do you see as the disadvantages to administrative computing?

5. What are the barriers to the administrative use of the microcomputer in the Virginia Beach elementary schools?

6. What are the facilitators to the administrative use of the microcomputer in the Virginia Beach elementary schools?

B. Discuss the administrative microcomputer training needs.

1. What type of information or knowledge do you need to make the microcomputer an administrative tool?

2. What are the skills needed to make the microcomputer an administrative tool?

3. What are your specific administrative microcomputer training needs as an elementary school administrator?

C. Discuss the future of administrative use of the microcomputer in the Virginia Beach elementary schools and policy recommendations for administrative computing.

1. What is the future for administrative use of the microcomputer in the Virginia Beach elementary schools?

2. Do you have any policy recommendations for the administrative use of the microcomputer in the Virginia Beach elementary schools?

3. What do you expect from the district in response to the use of the microcomputer for elementary school administrative management?

D. Specific questions for administrative microcomputer users from the two identified categories are as follows:

Successful user--If you were to start all over . . .?

Frustrated user--What can go wrong?
What are your frustrations?
What is your attitude toward administrative computing?
What are your expectations?

APPENDIX C

ADMINISTRATIVE MICROCOMPUTER TRAINING NEEDS ASSESSMENT: STRUCTURED SURVEY INSTRUMENT

ADMINISTRATIVE MICROCOMPUTER LITERACY TRAINING DESIGN FOR ELEMENTARY SCHOOL ADMINISTRATORS OF VIRGINIA BEACH, VIRGINIA

The purpose of this study is to conduct an administrative microcomputer training needs assessment and to design administrative microcomputer literacy training for elementary school administrators. Please answer all of the questions. Your responses will be confidential.

There are four parts to the questionnaire. The first includes demographic and usage information. The second is about your attitude toward the administrative use of microcomputers. The third part has to do with the barriers and facilitators influencing administrative microcomputer use in the schools. The fourth is about designing administrative microcomputer literacy training. The questionnaire should take you no more than fifteen minutes to complete.

Return the questionnaire in the enclosed stamped envelope. Your responses will be used to structure a training program.

Thank you.

ADMINISTRATIVE MICROCOMPUTER TRAINING NEEDS ASSESSMENT

I. THIS SECTION OF THE SURVEY IS ABOUT DEMOGRAPHIC AND USAGE INFORMATION

1. Position:

____ (1) Principal ____ (2) Assistant principal

2. Years in position:

____ (1) 1-4 years ____ (3) 11-15 years

____ (2) 5-10 years ____ (4) 16 years and above

3. Educational background:

____ (1) Science and mathematics ____ (3) Other

____ (2) Liberal arts

4. Gender: ____ (1) Male ____ (2) Female

5. Race: ____ (1) White ____ (2) Nonwhite

6. Age group:

____ (1) 20-25 years ____ (4) 46-60 years

____ (2) 26-35 years ____ (5) over 60 years

____ (3) 36-45 years

7. Approximately how many microcomputers are presently in your school?

Number _____

8. Do you own a personal microcomputer?

___ (1) Yes ____ (2) No

9. Indicate your level of competence with microcomputers (check one).

____ (1) Beginner, very little competence

____ (2) Some experience and beyond beginner level

____ (3) Quite a lot of experience

____ (4) Very able, considerable experience

10. How many hours of computer training have you had?

___ (1) 6 hours or fewer ____ (4) Over 18 hours

___ (2) 7 up to 12 hours ____ (5) None

___ (3) 13 up to 18 hours

11. Does your district have written goals for school administrators' computer literacy? Check the appropriate response.

____ (1) Yes, in place

____ (2) Yes, in progress

____ (3) No

____ (4) Don't know

II. THIS SECTION OF THE SURVEY IS ABOUT YOUR ATTITUDE TOWARD THE ADMINISTRATIVE USE OF MICROCOMPUTERS

12. When you think of the word "microcomputer", what words best describe your feelings? Circle 1 for Yes or 2 for No for each term.

Yes	No		Yes	No	
1	2	A. Innovative	1	2	B. Panic
1	2	C. Tense	1	2	D. Indifference
1	2	E. Confused	1	2	F. Fad
1	2	G. Challenged	1	2	H. Hostile
1	2	I. Fear	1	2	J. Receptive
1	2	K. Motivated	1	2	L. Pressure
1	2	M. Too complicated	1	2	N. More work
1	2	O. Excitement	1	2	P. Creative
1	2	Q. Threatened	1	2	R. Unprepared
1	2	S. Change	1	2	T. Dumb
1	2	U. Old	1	2	V. Useful

13. Indicate your attitude toward the following statements concerning the administrative use of microcomputers. Circle 1 if you strongly agree, 2 agree, 3 disagree, and 4 strongly disagree with the following statements.

	SA	A	D	SD
A. A person today cannot escape the influence of computers.	1	2	3	4
B. Computers dehumanize society by treating everyone as a number.	1	2	3	4
C. Computers are beyond the understanding of the typical person.	1	2	3	4
D. Computers are best suited for doing repetitive, monotonous tasks.	1	2	3	4
E. Computers will improve educational services.	1	2	3	4

F. Microcomputers are mostly for students.	1	2	3	4
G. Computers will create a need for specialized training.	1	2	3	4
H. I can't get enough time on our microcomputers.	1	2	3	4
I. We need more computer training at our school.	1	2	3	4
J. Our school needs more microcomputers.	1	2	3	4

K. Computers can be a management tool.	1	2	3	4
L. Microcomputers make me feel uncomfortable.	1	2	3	4
M. Our country would be better off if there were no computers.	1	2	3	4
N. If there was a computer in my office, it would help me be a better administrator.	1	2	3	4
O. Microcomputers are too complicated to be useful.	1	2	3	4

(questions adapted from Lichtman, 1979, and Wright/Stone, 1983, studies)

III. THIS SECTION OF THE SURVEY IS ABOUT THE BARRIERS AND FACILITATORS INFLUENCING ADMINISTRATIVE MICROCOMPUTER USE IN THE SCHOOLS.

14. What is your personal disposition toward the administrative use of the microcomputer?

___ (1) Positive

___ (2) Negative

___ (3) Mixed

15. What do you perceive as barriers influencing the administrative use of microcomputers? Circle 1 if you strongly agree, 2 agree, 3 disagree, and 4 strongly disagree.

SA	A	D	SD	
1	2	3	4	A. Resistance to automation
1	2	3	4	B. Computer phobia
1	2	3	4	C. Complexity of computer
1	2	3	4	D. Computer illiteracy
1	2	3	4	E. Lack of appropriate software
1	2	3	4	F. Initial/start-up costs
1	2	3	4	G. Security of information problems
1	2	3	4	H. Amount of time it takes to learn how to use microcomputers
1	2	3	4	I. Insufficient number of microcomputers in schools
1	2	3	4	J. Lack of administrative microcomputer literacy training

16. Viewing your school environment, how supportive are the following factors to the utilization of microcomputers in the schools? Circle 1 if you feel the factor is Very Supportive, 2 Supportive, and 3 Not Supportive.

VS	S	NS	
1	2	3	A. Teacher support
1	2	3	B. Student support
1	2	3	C. Parent support
1	2	3	D. Business/Community support
1	2	3	E. Ranking administrator support
1	2	3	F. Personal interest of school principal
1	2	3	G. Availability of space in schools
1	2	3	H. School computer resource teacher
1	2	3	I. University/college training assistance
1	2	3	J. Guidelines in obtaining hardware and software
1	2	3	K. Guidelines and procedures for implementing microcomputer use in schools

17. As you see it, which of the following organizational conditions is needed to support the change to administrative computing in the schools? Please circle 1 next to the factors you feel are very important, 2 somewhat important, and 3 not important.

	VI	SI	NI
A. Commitment to continuous staff training	1	2	3
B. Support expenditures for microcomputers	1	2	3
C. Bottom-up/participatory decision-making	1	2	3
D. District goals for administrators' computer literacy	1	2	3
E. Coercion	1	2	3
F. Endorsement by high-level school officials	1	2	3
G. School board policy concerning computer use	1	2	3
H. Incentives for school personnel to use microcomputers	1	2	3
I. District computer coordinator	1	2	3

18. Viewing your school system, which of the following facilitators are currently available in support of administrative use of microcomputers? Circle 1 for yes and 2 for No.

Yes	No	
1	2	A. Financial rewards
1	2	B. Promotion possibilities
1	2	C. Recognition possibilities
1	2	D. Release time
1	2	E. Access to a microcomputer in the school office
1	2	F. Access to a microcomputer on school administrator's desk
1	2	G. Access to a microcomputer that school administrators can take home
1	2	H. Administrative computer training that allows for individual user differences

19. Which of the following facilitators would influence the administrative use of microcomputers? Circle 1 if you strongly agree, 2 agree, 3 disagree, and 4 strongly disagree.

	SA	A	D	SD
A. Financial rewards	1	2	3	4
B. Promotion possibilities	1	2	3	4
C. Recognition for accomplishment	1	2	3	4
D. Release time	1	2	3	4
E. Access to a microcomputer in the school office	1	2	3	4
F. Access to a microcomputer on school administrator's desk	1	2	3	4
G. Access to microcomputer that school administrators can take home	1	2	3	4
H. Administrative computer training which allows for individual user differences	1	2	3	4

IV. THIS SECTION OF THE SURVEY IS ABOUT PLANNING ADMINISTRATIVE MICROCOMPUTER LITERACY TRAINING

20. Indicate your preference to the following training needs. Circle a 1 next to the needs you feel are very important, 2 somewhat important, and 3 not important in training school administrators for implementing microcomputer use in schools.

VI	SI	NI	
1	2	3	A. Knowledge of administrative uses of microcomputers
1	2	3	B. Knowledge of instructional uses of microcomputers
1	2	3	C. Knowledge of computer capabilities and constraints in education and school administration
1	2	3	D. Knowledge of the historical background of instructional and administrative computing
1	2	3	E. Knowledge of how a computer works and basic concepts of use
1	2	3	F. Knowledge of how to evaluate administrative software
1	2	3	G. Knowledge of the peripheral devices such as printers, storage devices, modems, and graphics tablets
1	2	3	H. Ability to implement computer use in your school
1	2	3	I. Ability to identify the computer training needs in your school
1	2	3	J. Ability to use a variety of software programs in personal, academic, and professional contexts
1	2	3	K. Ability to program data according to your informational needs
1	2	3	L. Ability to list factors to consider in making hardware and software decisions
1	2	3	M. Ability to acquire trouble-shooting skills for microcomputer operations in your school
1	2	3	N. Ability to write a computer program

21. As school administrators, the microcomputer has specific applications that could aid in your administrative tasks. Listed below are some administrative applications of the microcomputer. Using a scale from 1 to 3, write a 1 beside those administrative applications that would be the most useful to you in the management of your school, write a 2 beside the useful applications, and a 3 beside the least useful applications.

_____ Count and report attendance

_____ Keep special education/IEP records

_____ Maintain a discipline file

_____ Print mailing labels

_____ Write/edit reports, letters, etc.

_____ Schedule students

_____ Schedule teachers

_____ Keep teacher personnel records

_____ Keep school inventory control data

_____ Report student testing scores

_____ Plan bus routing

_____ Keep school library circulation information

_____ Maintain student cumulative records

_____ Evaluate student and teacher performance

_____ Monitor school budget/accounting files

_____ Count and report student fee collection

_____ Monitor cafeteria meal selections

_____ Other (Specify) _____

22. Please indicate your preference for each of the following microcomputer literacy training questions. Check either Yes or No for each response.

When would you like the training offered?

A. Summer offerings ____ (1) Yes ____ (2) No

B. During school hours ____ (1) Yes ____ (2) No

C. After school ____ (1) Yes ____ (2) No

D. Inservice days ____ (1) Yes ____ (2) No

Who do you prefer as trainers?

E. In-house trainers ____ (1) Yes ____ (2) No

F. Computer vendor trainers ____ (1) Yes ____ (2) No

G. Educational computer experts ____ (1) Yes ____ (2) No

H. Consultants ____ (1) Yes ____ (2) No

Which training formats do you prefer?

I. Workshops ____ (1) Yes ____ (2) No

J. Courses and options ____ (1) Yes ____ (2) No

K. Levels of instruction ____ (1) Yes ____ (2) No

L. On-the-job training ____ (1) Yes ____ (2) No

23. What is your particular learning style? (Check one response in each group)

_____ A. (1) Lectures

_____ B. (2) Discussion

_____ C. (3) Hands-on training

_____ D. (1) Large-group instruction

_____ E. (2) Small-group instruction

_____ F. (3) Individual instruction

WHEN YOU HAVE COMPLETED THE SURVEY, PLEASE RETURN IT IN THE ENCLOSED, SELF-ADDRESSED, STAMPED ENVELOPE. THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY.

APPENDIX D

COVER LETTER FOR STRUCTURED SURVEY INSTRUMENT

Virginia Beach Public Schools
Code: 6000
Date: February 28, 1985
Memo Number: 32-E

MEMORANDUM

TO: All Elementary Principals and Assistant Principals

FROM: James C. Mounie, Director
Office of Planning, Assessment, and Resource Development

SUBJECT: Microcomputer Training Needs Survey

This office has authorized Mrs. Karen A. Bosch to conduct a microcomputer training needs assessment of elementary school administrators in conjunction with her doctoral dissertation. The enclosed survey has been designed to provide this office and the staff development office with data that can be useful in the design of staff development activities related to the administrative use of computers in the elementary schools. It is important that each elementary principal and assistant principal respond to the survey.

The survey should take approximately 15 minutes to complete. While your response will be confidential, for purposes of follow-up, the forms have been coded. Please complete the survey and return it on the enclosed self-addressed, stamped envelope by March 12, 1985. Copies of the final report will be sent to you.

Your cooperation is appreciated.

/dlc --109

Enclosures

AUTOBIOGRAPHICAL STATEMENT

Karen A. Bosch was born in Holland, Michigan, on March 20, 1946. Mrs. Bosch received a Bachelor of Arts in Elementary Education from Michigan State University in 1970 and a Master of Arts in Adult and Community Education from Indiana University of Pennsylvania in 1977. She was a recipient of an Old Dominion University Doctoral Fellowship. Mrs. Bosch is an active member in the Delta Kappa Gamma Honor Society International for Women Educators.

Mrs. Bosch has been a public school elementary teacher, adult education teacher and coordinator, and school district administrator in adult and continuing education.